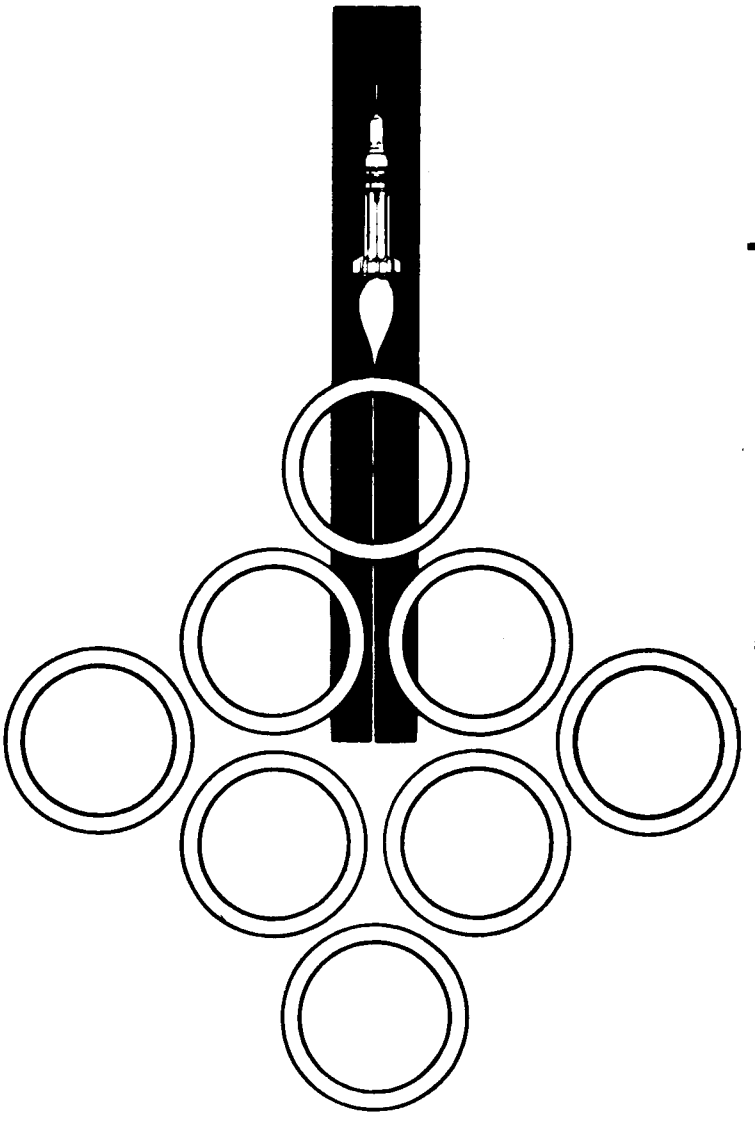

ENGINEERING DEPARTMENT

TECHNICAL MANUAL

SDES-64-415

Saturn I

LAUNCH VEHICLE SA-10 AND LAUNCH COMPLEX 37B FUNCTIONAL SYSTEMS DESCRIPTION

Volume V

PNEUMATIC DISTRIBUTION SYSTEM FUNCTIONAL DESCRIPTION, INDEX OF FINDING NUMBERS, AND MECHANICAL SCHEMATICS

SPACE DIVISION CHRYSLER CORPORATION

SDES-64-415

SATURN I
LAUNCH VEHICLE SA-10
AND
LAUNCH COMPLEX 37B
FUNCTIONAL SYSTEMS DESCRIPTION

VOLUME V
PNEUMATIC DISTRIBUTION SYSTEM
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AUGUST 1964

CHRYSLER CORPORATION SPACE DIVISION - NEW ORLEANS, LOUISIANA

1431-9-30-64

FOREWORD

This volume is one of a set of eleven volumes that describe mechanical and electro-mechanical systems of the Saturn I, SA-10 launch vehicle and launch complex 37B. The eleven-volume set is prepared for the Functional Integration Section, Systems Integration and Operations Branch, Vehicle Systems Division, P&VE Laboratory, MSFC, by Systems Engineering Branch, Chrysler Corporation Space Division under Contract NAS 8-4016. Volume titles are listed below:

Volume I	RP-1 Fuel System
Volume II	LOX System
Volume III	LH_2 Fuel System
Volume IV	Nitrogen and Helium Storage Facility
Volume V	Pneumatic Distribution System
Volume VI	Environmental Conditioning Systems
Volume VII	Launch Pad Accessories
Volume VIII	H-1 Engine and Hydraulic System
Volume IX	RL10A-3 Engine and Hydraulic System
Volume X	Separation and Flight Termination Systems
Volume XI	Supplement: Legend and Composite Schematic

The technical content of this volume reflects the most up-to-date design information available from the S-I/S-IB Project Engineer, R-P&VE on August 1, 1964.

System mechanical schematics are provided in section 3 to support the functional description of the system. The index of finding numbers in section 2 provides physical and functional descriptions of components identified on the mechanical schematics.

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SECTION 1

FUNCTIONAL DESCRIPTION

1.1 INTRODUCTION

The pneumatic distribution system receives gaseous nitrogen (GN_2) and helium (He) from the nitrogen and helium storage facility (volume IV) and distributes these gases to the S-I stage, the S-IV stage, and the instrument unit of launch vehicle SA-10. The pneumatic system also supplies the GN_2 and helium required for prelaunch service of the vehicle and pressurizes the on-board GN_2 and helium systems that function during flight.

Figure 1-1 illustrates the functional relationship of the various major assemblies and subassemblies within the pneumatic distribution system.

1.2 PNEUMATIC DISTRIBUTION SYSTEM OPERATIONS

Pneumatic distribution system operations cover in detail the distribution of helium and GN_2 to components, systems, and subsystems of the launch complex and vehicle on-board storage systems. The operation and function of each major equipment in the system is described in detail.

1.2.1 Pneumatic Control Distributor Operation - The pneumatic control distributor (PCD) (figure 3-1) receives GN_2 and helium at 6000 psig from the GN_2 and helium storage facility (volume IV). The GN_2 section of the PCD supplies 6000-psig GN_2 to valve panel B, and 3000-psig GN_2 to valve panels No. 5, No. 9, and No. 10, and the deluge purge panel (volume VI). The helium section of the PCD supplies 6000-psig helium to valve panel A, and 3000-psig helium to valve panels No. 5, No. 9, and No. 10.

1.2.1.1 GN_2 Section. The GN_2 section of the PCD receives GN_2 at a pressure of 6000 psig through three input lines. The three lines route the GN_2 to similar pressure reducing networks within the PCD. The 6000-psig GN_2 input is reduced to 3000 psig in each network and is routed to a common manifold. From the manifold, GN_2 is routed to the valve panels and various other components located in the vehicle and launch complex. Because of the similarity of the pressure reducing networks, only one network is described in detail.

Opening Manual Valve A1452 allows the 6000-psig GN_2 to flow past Relief Valve A1451 to 10-micron Filter A1453. GN_2 is then routed into a reference pressure line through Manual Valve A1471. The reference pressure line is supplied by all three input lines and the pressure is monitored by Pressure Gage A1468 and Pressure Transducer A1469. The reference pressure line supplies 6000-psig GN_2 to Pressure Regulators A1467 and A1491. GN_2 at 3000 psig from Pressure Regulator A1467 flows past Pressure Gage A1464, through Solenoid Valve A1463 and Orifice A1461 to the domes of mainstream Pressure Regulators A1457 and A1458. Overpressure protection for the domes of Pressure Regulators A1457 and A1458 is provided by Relief Valve A1456.

The mainstream input to Pressure Regulators A1457 and A1458 is reduced to 3000 psig and is routed to Distribution Manifold A1577 through Manual Valve A1459.

The 6000-psig GN_2 supply line can be bled by Manual Valve A1473 through Check Valve A1586 into Vent Manifold A1509. The 3000-psig reference pressure supply line between Manual Valve A1471 and Solenoid Valve A1463 can be bled by Manual Valve A1466, through Check Valve A1465 into Vent Manifold A1580. The other two pressure reducing networks which supply the distribution manifold function in the manner described with one exception. Mainstream Pressure Regulators A1505, A1506, A1481, and A1482 receive dome-loading reference pressure from Pressure Regulator A1491 instead of each pair using a separate reference supply.

GN_2 at 6000 psig is routed from Filter A1498 through Manual Valve A1516 to valve panel B. Output to valve panel B is monitored by Pressure Gage A1518. The distribution line can be bled by Manual Valve A1519, through Check Valve A1579, into Vent Manifold A1509.

Distribution Manifold A1577 distributes a demand supply of GN_2 to several valve panels and equipments. Distribution through each supply line from the manifold is controlled by a manual valve and monitored by a pressure switch. Each supply line can be bled by a manual vent valve through a check valve to the vent manifold. The following list summarizes the finding numbers of components in each supply line.

Supply Line	Manual Valve	Pressure Switch	Manual Vent Valve	Check Valve
Valve panel No. 5	A1534	A1543	A1561	A1570
Valve panel No. 9	A1537	A1546	A1564	A1573
Valve panel No. 10	A1536	A1545	A1563	A1572
Valve panel No. 10	A1535	A1544	A1562	A1571
Deluge purge panel	A1533	A1542	A1560	A1569
Deluge purge panel	A1532	A1541	A1559	A1568

The distribution manifold can be bled by Manual Valve A1529 through Check Valve A1528 into Vent Manifold A1580. Distribution Manifold A1577 is protected from overpressurization by Relief Valves A1526 and A1527 which are vented into Vent Manifold A1580. To conserve helium when performing a functional checkout of the helium system, GN_2 is supplied to Distribution Manifold A1635 through Manual Valves A1584 and A1694. The interconnecting line between the two distribution manifolds can be bled by Manual Valve A6058 through Check Valve A6059 into a vent manifold. Pressure in the distribution manifold is indicated by Pressure Gage A1525 and Pressure Transducer A1524 through Shuttle Valve A1581.

1.2.1.2 Helium Section. The helium section of the PCD receives helium at a pressure of 6000 psig through two input lines. The two lines route helium to similar pressure reducing networks within the PCD. The 6000-psig helium input is reduced to 3000 psig in each network and routed to a common manifold. From the manifold, helium is routed to the valve panels and various other components located in the vehicle and launch complex. Because of similarity of the pressure reducing networks, only one network is described in detail.

Opening Manual Valve A1611 allows helium at 6000 psig to flow past Relief Valve A1610 to 10-micron Filter A1612. The helium is then routed into a reference pressure line through Manual Valve A1627. The reference pressure line is supplied by both input lines and is monitored by Pressure Gage A1603 and Pressure Transducer A1604. The reference pressure line routes helium at 6000 psig to Pressure Regulators A1626 and A1602. The 3000-psig output from Pressure Regulator A1626 flows past Pressure Gage A1623, through Solenoid Valve A1622 and Orifice A1620 to the domes of mainstream Pressure Regulators A1616 and A1617. The mainstream input to Pressure Regulators A1616 and A1617 is reduced to 3000 psig and is routed to Distribution Manifold A1635 through Manual Valve A1618. The domes of Pressure Regulators A1616 and A1617 are protected from overpressurization by Relief Valve A1615.

The 6000-psig supply line can be bled by Manual Valve A1629 through Check Valve A5406 into Vent Manifold A1509. The 3000-psig reference pressure supply line between Manual Valve A1627 and Solenoid Valve A1622 can be bled by Manual Valve A1624 through Check Valve A1625 into Vent Manifold A1697. Distribution of helium at 6000 psig to valve panel A is controlled by Manual Valve A1631 and monitored by Pressure Gage A1634. The distribution line can be bled by Manual Valve A1633 through Check Valve A1696 into Vent Manifold A1509.

Distribution Manifold A1635 supplies helium on demand to several valve panels and equipments. Distribution from each supply line is controlled by a manual valve and monitored by a pressure switch. Each supply line can be bled by a manual vent valve through a check valve to the vent manifold. The following list summarizes the finding numbers of components in each supply line.

Supply Line	Manual Valve	Pressure Switch	Manual Vent Valve	Check Valve
Valve panel No. 9	A1646	A1655	A1673	A1682
Valve panel No. 10	A1650	A1659	A1677	A1686
Valve panel No. 10	A1651	A1660	A1678	A1687

Distribution Manifold A1635 can be bled by Manual Valve A1645 through Check Valve A1644 into Vent Manifold A1697. The distribution manifold is protected from overpressurization by Relief Valves A1642 and A1643 which are vented into Vent Manifold A1697. To conserve helium when performing a functional checkout of the helium system, GN_2 is supplied to Distribution Manifold A1635 from Distribution Manifold A1577 through

Manual Valves A1584 and A1694. The interconnecting line can be bled by Manual Valve A6058 through Check Valve A6059 into a vent manifold. Pressure in the distribution manifold is indicated by Pressure Gage A1641 and Pressure Transducer A1640 through Shuttle Valve A5403.

1.2.2 Valve Panel No. 5 Operation - Valve panel No. 5 (figure 3-2) receives GN_2 and helium at 3000 psig from the PCD. GN_2 is distributed at supply pressure and at reduced pressure to various launch complex and vehicle subsystems. The helium section of the panel is inoperative.

GN_2 supplied to valve panel No. 5 is filtered by 5-micron Filter A2052 and flows past Pressure Gage A2053 to Distribution Manifold A2054. The following paragraphs explain the distribution paths of GN_2 through valve panel No. 5.

1.2.2.1 Swing Arm Control Panels and Environmental Control System Supply. Opening Manual Valve A2055 allows GN_2 at 3000 psig to flow into Pressure Regulators A2056 and A2057. Pressure Regulator A2056 reduces the input to 50 psig. The regulated output is routed past Relief Valve A2157 to load the dome of Pressure Regulator A2057. Pressure Regulator A2057 has an internal relief valve which ensures that the output of the regulator is never greater than the pressure supplied to the dome. The internal relief valve is exhausted through Check Valve A2165 to a vent manifold. The 50-psig output of Pressure Regulator A2057 is supplied to the distribution line and is monitored by Pressure Gage A2059 and Pressure Switch A2061 through Shuttle Valve A2060. Relief Valve A2058 protects the distribution line from overpressurization. The distribution line can be bled by Manual Valve A2063 through Check Valve A2072 into Vent Manifold A2159. The output of the distribution line is routed to the umbilical tower where it is used to supply an inert atmosphere in valve panel No. 9 and the swing arm control panels (volume VII). The output is also supplied to the environmental conditioning systems facility where it is used to activate pneumatic control valves (volume VI).

1.2.2.2 Launcher, Short Cable Masts, Holddown Arms, and Valve Box Purge Supply. Opening Manual Valve A2119 allows GN_2 at 3000 psig to flow to Pressure Regulators A2120 and A2121. Pressure Regulator A2120 reduces the input to 50 psig. The regulated output is routed past Relief Valve A2158 to load the dome of Pressure Regulator A2121. Pressure Regulator A2121 has an internal relief valve which ensures that the regulator output is never greater than the pressure supplied to the dome. The internal relief valve is exhausted through Check Valve A2134 to a vent manifold. The 50-psig output of Pressure Regulator A2121 is supplied to the distribution line and is monitored by Pressure Gage A2123 and Pressure Switch A2125 through Shuttle Valve A2124. Relief Valve A2122 protects the distribution line from overpressurization. The distribution line can be bled by Manual Valve A2127 through Check Valve A2128. GN_2 at 50 psig is supplied to the launcher for purging the electrical panels, to the short cable masts to purge the umbilical plate housings, to four holddown arms to purge switch housings, and to a valve box on the launcher to purge the enclosure.

1.2.2.3 Swing Arm Accumulator Supply. Opening Manual Valve A2066 allows GN_2 at 3000 psig to flow to the umbilical tower swing arm hydraulic systems where it is used

to charge the accumulators. After deactivation, high pressure locked within the lines can be bled off by Manual Valve A2067, through Check Valve A2068 into Vent Manifold A2159.

1.2.2.4 Gas Bearing Supply. Opening Manual Valve A2077 allows GN_2 at 3000 psig to flow through Check Valve A2079 into 10-micron Mechanical Filter A2080. The GN_2 then flows through Purifiers A2103, A2102, and A2081. The GN_2 is filtered again by 2-micron Filter A2071. The GN_2 then passes through Orifice A2082 to Solenoid Valve A2083. Solenoid Valve A2083 normally controls the application of the gas bearing supply to the vehicle. Manual Valve A2084 may be opened to bypass the solenoid valve. Manual Valve A2085 and Test Outlet A2086 are used to make leakage checks of Check Valve G502 (figure 3-7) on the vehicle. After the storage spheres on the vehicle are filled and the supply line deactivated, any leakage past the check valve may be detected by opening Manual Valve A2085 (figure 3-2) and making a soap test at Test Outlet A2086. The supply line is vented by Manual Valve A2087 through Check Valve A2088 into Vent Manifold A2159. The gas bearing supply is routed through swing arm No. 3 and flows to the vehicle through Quick-Disconnect Couplings A3248 and G500 (figure 3-7).

Inside the instrument unit, the GN_2 supply is filtered by 20-micron Filter G501 and passes through Check Valve G502 to fill one-cubic-foot Storage Sphere G503. Pressure Switch G505 transmits a high-pressure OK signal to remote monitoring equipment when the sphere is pressurized to 2852 (± 100) psig. Pressure Switch G506 is a low-pressure safety switch that actuates if the storage pressure should decay to 1375 (± 33) psig during standby operation. When low pressure is sensed, Pressure Switch G506 energizes Regulator Valve Assembly G507 and deenergizes Stabilized Platform G511. Manual Valve G504 is used to calibrate Pressure Switches G505 and G506. Regulator Valve Assembly G507 is a two-rate pressure reducer, filter, and heater. In the normal condition, GN_2 flowing through the valve assembly is filtered, regulated to 30 psig, and heated to a temperature of 25 C. Internal heaters, controlled by Thermostat G509, heat the GN_2 as required. The valve assembly uses pressure from a feedback line as a reference for maintaining a stable pressure within the gas bearings. A decrease in the reference pressure causes the output of the valve assembly to increase. Conversely, the output of the valve assembly will decrease if the reference pressure increases. Thus, the pressure within the gas bearings is held constant for both ground and high altitude conditions. When Regulator Valve Assembly G507 is energized, the main path through the valve assembly is blocked. The GN_2 then flows through an internal bypass orifice which reduces the pressure to approximately 4 psig. The reduced pressure permits safe bearing run-out while the speed of the gyros in Stabilized Platform G511 decays. From the valve assembly, the GN_2 flows through 20-micron Filter G508, passes through Manifold G510, and is then routed to the gas bearings of the stabilized platform.

1.2.2.5 GN_2 Distribution Manifold Supply (Figure 3-2). Dome-loaded Pressure Regulator A2091 furnishes GN_2 at 750 psig to Distribution Manifold A2092. Pressure Regulator A2090 reduces 3000-psig GN_2 to 750 psig to load the dome of Pressure Regulator A2091. Pressure Regulator A2091 then regulates the output to maintain a constant pressure regardless of the flow rate. Pressure in the manifold is monitored by Pressure Gage A2094 and Pressure Switch A2096 through Shuttle Valve A2095. The distribution manifold can be bled by Manual Valve A2098 through Check Valve A2099 into Vent Manifold A2159. During operation, the manifold is protected from overpressurization by Relief Valve A2093.

1.2.2.6 Level Adjust Regulator Supply and S-I Stage LOX Replenish Valve Supply. Opening Manual Valve A2108 allows GN_2 at 750 psig to flow into Pressure Regulator A2109. The regulator is an internally-loaded pressure regulator whose output is set to 25 psig. The 25-psig output pressure is routed through the distribution line to the level adjust regulator in the fuel transfer complex and to the S-I stage LOX replenish valves in the LOX replenishing complex. The distribution line is protected from over-pressurization by Relief Valve A2110. Manual Valve A2115 can be used to vent the distribution line to the atmosphere through Muffler A2116. Pressure in the distribution line is monitored by Pressure Gage A2111 and Pressure Switch A2113 through Shuttle Valve A2112.

1.2.2.7 Environmental Conditioning System Valve Supply. Opening Manual Valve A2162 activates the 750-psig GN_2 supply for the conditioned air or GN_2 control valves (A4387 and A4388, volume VI). Pressure in the distribution line is monitored by Pressure Gage A2161. The line can be bled by Manual Valve A2163 through Check Valve A2164 into Vent Manifold A2159.

1.2.2.8 Swing Arms Supply. Opening Manual Valve A2130 allows GN_2 at 750 psig to flow from Distribution Manifold A2092 into swing arm supply distribution line. GN_2 at 750 psig flows to the swing arm control panels for control of the hydraulic systems, and to the swing arms to purge and release the umbilical housings. The supply to swing arm No. 2 is also used to actuate the propellant shutoff valves. The distribution line can be bled by Manual Valve A2131 through Check Valve A2132 into Vent Manifold A2159.

1.2.2.9 Booster Line Valve Control Supply. GN_2 at 750 psig is furnished from Distribution Manifold A2092 to the booster line control pneumatic valve (A587, volume I) through remotely actuated Solenoid Valves A2135 and A2138. Solenoid Valve A2135 controls the closing supply and is normally open so that closing pressure is constantly supplied to the valve. When Solenoid Valve A2135 is energized, it shuts off the closing pressure and bleeds the close control line through Check Valve A2136 into Vent Manifold A2159. Solenoid Valve A2138 controls the opening supply and is normally closed so that the opening control line is not pressurized and is bled into vent manifold through normally opened Manual Valve A2139 and Check Valve A2140. Solenoid Valves A2135 and A2138 are controlled by a single switch so that they are energized and deenergized simultaneously. However, Manual Valve A2139 may be closed so the opening line will remain pressurized and the booster line control pneumatic valve will remain open, even though Solenoid Valve A2138 is not energized.

1.2.3 Valve Panel No. 9 Operation - Valve panel No. 9 (figure 3-3) receives GN_2 and helium at 3000 psig from the PCD and distributes the gases at supply pressure and at reduced pressures to various launch complex and vehicle subsystems. The valve panel is pruged with GN_2 at 50 psig through Orifice A5078. The purge supply is activated during the countdown sequence to reduce fire hazards. The purge gas is vented from the panel through calibrated Bleed Plate A5079 which maintains a pressure inside the enclosure.

1.2.3.1 High-Pressure Spheres Supply. GN_2 at 3000 psig is supplied to two 20-cubic-foot storage spheres, four 3-cubic-foot triplex storage sphere assemblies and one one-cubic-foot storage sphere in the S-I stage. The gas in the 20-cubic-foot spheres is used to pressurize the S-I stage fuel tanks after the vehicle is launched. The gas in the triplex sphere assemblies is used for the LOX/SOX disposal system. The gas in the one-cubic-foot sphere is used to purge the separation T V camera lens. Opening Manual Valve A5001 allows GN_2 at 3000 psig to flow through 5-micron Filter A5002, past monitoring Pressure Gage A5004 to Solenoid Valve A5010. When Solenoid Valve A5010 is energized, the GN_2 flows through Orifice A3052, Quick-Disconnect Couplings A3063 and B250 (figure 3-5), Filter B251, and Check Valve B252 into Storage Spheres B253. GN_2 also flows through Check Valve B231 into Storage Spheres B198, B199, and B232, and through Check Valve BB into Storage Sphere BA. Pressure Switch B258, actuated through calibrating Manual Valve B257, actuates at approximately 2800 psig and transmits a spheres pressure OK signal to the launch complex. The signal from Pressure Switch B258 is in the launch interlock circuit so that the S-I stage engines will not ignite unless the pressure OK signal is present.

At launch minus one day, the spheres are filled to approximately 1500 psig. At approximately launch minus one hour, the pressure in the spheres is increased to the maximum (2800 psig). After launch, the GN_2 is released from Storage Spheres B253 to the fuel tanks through three filters and automatically sequenced solenoid valves. After approximately 70 seconds of flight, Solenoid Valves B233 and B234 are energized. When the solenoid valves are open, residual pressure in Storage Spheres B253 is equalized with the pressure in triplex Storage Spheres B198, B199, and B232 through Manifold B235. Thus, the unused GN_2 in the fuel tank pressurization spheres provides an additional supply for LOX/SOX vaporization.

Just prior to turning on the separation T V camera, Solenoid Valve BF is actuated and GN_2 flows through Nozzle Assembly BA-1 starting the purge of the camera lens. This purge continues throughout operation of the T V camera.

Shortly before the S-I stage burns out, the RL10A-3 engines in the S-IV stage are cooled with LOX. The chilldown LOX is exhausted into the S-IV aft interstage. Expansion of LOX in the rarified atmosphere causes solid oxygen (SOX) to form. The presence of LOX/SOX and the possible presence of hydrogen in the interstage constitutes an explosive hazard. Therefore, during S-IV stage chilldown, Solenoid Valves B236 through B242 are opened and GN_2 flows through Plenum Chamber B243 and through the six Dispersal Manifolds B247 into the interstage. The GN_2 dilutes the LOX/SOX and hydrogen and purges the mixture from the area. Solenoid Valves B236 through B242 are energized sequentially by a programmed tape to maintain a relatively constant GN_2 flow rate into the plenum chamber.

Manual Valve A5008 (figure 3-3) can be opened to bypass Solenoid Valve A5010. Solenoid Valve A5009 bleeds the supply line through Muffler A5014 when the supply is deactivated. Manual Valve A5007 can be opened to bypass Solenoid Valve A5009. Manual Valve A5006 is used to test Check Valve B252 on the S-I stage for leakage. After the spheres are filled and the supply lines are deactivated and bled, any gas detected at Test Outlet A5013 will be caused by a defective Check Valve B252. Manual Valve A5005 can be used to bleed the supply line upstream of Solenoid Valve A5010.

1.2.3.2 LOX Transfer Complex and S-I Stage Fuel Tank Vent Valve Opening Control Supply. The LOX transfer complex and fuel tank vent valve opening control supply of 750-psig GN_2 is used to actuate pneumatic valves in the LOX transfer complex and to open the vent valves on the S-I stage fuel tanks. GN_2 at 3000 psig is routed from the valve panel No. 9 input line. The GN_2 input branches downstream of Filter A5002 to Pressure Regulators A5019 and A5018. Pressure Regulator A5019 loads the dome of dome-loaded Pressure Regulator A5018. Pressure Regulator A5018 reduces the 3000-psig GN_2 supply to 750 psig. The output flows past Relief Valve A5020, Pressure Gage A5021, and Manual Valve A5022 to Solenoid Valve A5023. When Solenoid Valve A5023 is energized, the GN_2 is routed to the S-I stage through quick-disconnect couplings at swing arm No. 1 to open the fuel tank vent valves. When Solenoid Valve A5023 is de-energized, the downstream line is automatically vented through the vent port of the valve. Manual Valve A5022 can be used to vent the line upstream of Solenoid Valve A5023.

A branch line upstream of Solenoid Valve A5023 routes the 750-psig GN_2 to the LOX transfer complex where it is used to actuate pneumatic control valves A4004 and A4008, (volume II).

1.2.3.3 S-I Stage Fuel Tanking Computer and Density Computer Sensor Supplies. Helium at 3000 psig enters valve panel No. 9 through Manual Valve A5046 and flows past monitoring Pressure Gage A5047 through Filter A5048 to Pressure Regulator A5050. The 450-psig output of the regulator is then routed into two branch lines. Both lines are protected from overpressurization by Relief Valve A5073. The helium in one branch flows through Orifice A5061, which reduces the pressure to 150 psig, past monitoring Pressure Switch A5063, and to Orifice A5064. Orifice A5064 further reduces the line pressure to approximately 16 psig. The actual pressure is determined by the rate of flow through Orifice A5064 which is in turn determined by the amount of fuel in the tanks (volume I). The 16-psig helium is supplied directly to the S-I stage fuel tank sensor through a quick-disconnect coupling at swing arm No. 1. The 16-psig helium output from A5064 is also routed through normally open Solenoid Valve A5066 to the fuel density computer and the fuel tanking computer. The fuel tanking computer also receives fuel tank ullage pressure through normally open Solenoid Valve A5070.

From Pressure Regulator A5050, the other branch of helium flows through Orifice A5053 which reduces the pressure to 150 psig, past monitoring Pressure Switch A5055, and to Orifice A5056. Orifice A5056 further reduces the line pressure to approximately 16 psig. However, the actual pressure is determined by the rate of flow through Orifice A5056 which in turn is determined by the amount of fuel in the tanks (volume I). The 16-psig helium is supplied to the density sensor in the fuel tank through a quick-disconnect coupling at swing arm No. 1. The helium output from Orifice A5064 is also routed through normally open Solenoid Valve A5058 to the fuel density computer.

1.2.4 Valve Panel No. 10 Operation - Valve panel No. 10 (figure 3-4) receives GN_2 and helium at 3000 psig from the pneumatic control distributor (PCD). The valve panel distributes the gases at line pressure and reduced pressures to purge and bubbling systems, pneumatically controlled equipment, and to vehicle pressurizing systems. GN_2 enters valve panel No. 10 through 5-micron Filters A5152 and A5153; Pressure Gage

A5156 monitors the panel pressure. The GN_2 then pressurizes Distribution Manifold A5157 and adjacent piping to 3000 psig.

Helium enters valve panel No. 10 through 5-micron Filters A5237 and A5238, passes Pressure Gage A5241 and flows to a branch line which routes the flow to the holddown arms release control panel, LOX bubbling supply equipment, LOX tanking computer sensor equipment, and to the LOX tank pressurization supply equipment. The following paragraphs explain the distribution paths of GN_2 and helium through valve panel No. 10.

1.2.4.1 S-I Stage Control Pressure System Supply. The S-I stage control pressure system receives GN_2 at 3000 psig from valve panel No. 10. When Solenoid Valve A5158 is energized, the GN_2 flows from Distribution Manifold A5157 through the solenoid valve and Orifice A6628 to Quick-Disconnect Coupling A6603. Manual Valve A5159 can be opened to bypass the solenoid valve. The output line can be bled by Manual Valve A5160 through Check Valve A5161 to Vent Manifold A5255. Manual Valve A5162 and Test Outlet A5163 are used to test Check Valve B202 (figure 3-5) on the vehicle for leakage. After the storage spheres on the vehicle are filled, Solenoid Valve A5158 is deenergized and the output line is bled. Gas detected at Test Outlet A5163 when Manual Valve A5162 is opened will indicate that Check Valve B202 is defective. From Quick-Disconnect Coupling A6603, located on short cable mast No. 4, the GN_2 enters the vehicle through Quick-Disconnect Coupling B200. From the quick-disconnect coupling the GN_2 passes through 25-micron Filter B201, Check Valve B202, and into Storage Sphere B205. GN_2 also flows to Solenoid Valve B207, and into Storage Sphere B206. When Manual Valve B204 is open, Pressure Switch B203 transmits a high-pressure OK signal to the launch complex indicating that the spheres are charged. The spheres can be vented by energizing Solenoid Valve B207. During normal operation, the GN_2 from Storage Spheres B205 and B206 flows through 25-micron Filter B208 to Pressure Regulator B209. From Pressure Regulator B209, GN_2 at 750 psig is supplied to control pressure Manifold B211. Pressure Switch B213 connects to Manifold B211 through Manual Valve B212. When actuated, Pressure Switch B213 transmits a pressure OK signal to the launch complex. The control pressure manifold and distribution lines are protected from overpressurization by Relief Valve B210.

The radiation calorimeter purge supply keeps the window of Calorimeter B221 bathed in a flow of GN_2 to prevent products of engine combustion from being deposited on the window. The flow is activated a few seconds before engine ignition by energizing Solenoid Valve B220. The GN_2 then flows at 750 psig from control pressure Manifold B211, through open Solenoid Valve B220, through Orifice B219, and into Calorimeter B221. The GN_2 is vented to the atmosphere after leaving the calorimeter. The orifice, in addition to controlling the flow rate of GN_2 to the calorimeter, also serves as a safety device to prevent depletion of the control pressure system in the event of loss of calorimeter.

1.2.4.2 Engine LOX Dome Purge Supply (Figure 3-4). GN_2 at 3000 psig is supplied from Distribution Manifold A5157 to Pressure Regulator A5220 which reduces and regulates the pressure to 240 psig. The 240-psig GN_2, monitored by Pressure Gage A5229, is supplied to the dome of Pressure Regulator A5232. When Solenoid Valve

A5222 is energized, the supply also loads the dome of Pressure Regulator A5223 through Orifice A5221. Pressure Gage A5233 monitors the pressure of the LOX dome purge bypass supply. When Solenoid Valve A5234 is energized, the 240-psig GN_2 bypass supply is routed to Quick-Disconnect Couplings A6502 and A6504 on short cable mast No. 2 to purge the LOX dome of the inboard and outboard engines. Manual Valve A5287 can be opened to bypass Solenoid Valve A5234. The flow rate of the output is increased when Solenoid Valve A5222 is energized for full LOX dome purging by adding the output of Pressure Regulator A5223 to the supply. The LOX dome bypass purge is activated when the thrust chamber covers are removed and continues until just prior to launch. Full LOX dome purge is activated just before launch and continues until overcome by LOX pressure in the dome. The LOX dome purge supply pressure is monitored by Pressure Switch A5227 which connects to the output line through Shuttle Valve A5226 and transmits a pressure OK signal to remote monitoring equipment when actuated. Relief Valve A5224 protects the output lines from overpressurization.

1.2.4.3 Thrust Chamber Fuel Injector Manifold Purge Supply. GN_2 at 3000 psig is supplied from Distribution Manifold A5157 to Pressure Regulators A5196 and A5199. Pressure Regulator A5196 reduces the pressure to 490 psig and the output is routed past Pressure Gage A5205 to Solenoid Valve A5198. When Solenoid Valve A5198 is energized the 490-psig GN_2 flows through Orifice A5197 and past Solenoid Valve A5154 to load the dome of Pressure Regulator A5199. Solenoid Valve A5154 when energized, vents the dome loading supply line. When the dome of Pressure Regulator A5199 is loaded, the pressure regulator reduces the 3000-psig GN_2 input to 490 psig. The output is routed to the vehicle through Quick-Disconnect Coupling A6503 on short cable mast No. 2. The output is monitored by Pressure Switch A5203 through calibrating Shuttle Valve A5202. The switch normally transmits a pressure OK signal to remote monitoring equipment. The output line is protected from overpressurization by Relief Valve A5200.

The output line may be vented to the atmosphere by opening Pneumatic Valve A6084. Pneumatic Valve A6084 is closed by 750-psig GN_2 supplied through normally open Solenoid Valve A6085 and opened by 750-psig GN_2 through Solenoid Valve A6086. Simultaneous actuation of the solenoid valves causes the pneumatic valve to open and vent the thrust chamber fuel injector manifold purge supply line. The two solenoid valves receive their supply of 750-psig GN_2 from the launcher distribution circuit. The solenoid valves are housed in a valve box on the launcher. The box is purged with 50-psig GN_2 through Orifice A6082; Calibrated Bleed Plate A6087 vents GN_2 from the box and maintains a low pressure within. Check Valves A6088 and A6089 vent Solenoid Valves A6085 and A6086, respectively, and keep foreign matter from entering the vent ports.

1.2.4.4 Gas Generator LOX Injector Manifold Purge Supply. 3000-psig GN_2 from Distribution Manifold A5157 is supplied to Pressure Regulator A5208. The output is monitored by Pressure Gage A5217 and is supplied to the dome of Pressure Regulator A5211 through Orifice A5209 when Solenoid Valve A5210 is energized. When the dome of Pressure Regulator A5211 is loaded, it passes GN_2 and regulates the output to 300 psig. The output is routed to the vehicle through Quick-Disconnect Coupling A6608 on short cable mast No. 4. The pressure of the gas generator LOX injector purge supply

is monitored by Pressure Switch A5215 through Shuttle Valve A5214. The output lines are protected from overpressurization by Relief Valve A5212.

1.2.4.5 Fuel Bubbling Supply. GN_2 at 290 psig is supplied to the S-I stage for fuel bubbling. The GN_2 is used to agitate the RP-1 fuel in the suction lines and tanks to prevent slushing and foreign particle sedementation after the stage has been fueled. Opening Manual Valve A5267 allows GN_2 at 3000 psig to flow into Pressure Regulators A5185 and A5186. Pressure Regulator A5185 is preset for a 290-psig output which is applied to the dome of Pressure Regulator A5186. Pressure Regulator A5186 then reduces the mainstream 3000-psig GN_2 to 290 psig in accordance with the dome load. The 290-psig GN_2 output is supplied through Solenoid Valve A5194 to a quick-disconnect coupling (A6505, volume I) and into the S-I stage. The output line pressure is monitored by Pressure Gage A5193 and by Pressure Switch A5191 through Shuttle Valve 5190. Manual Valve A5187 is used to bleed the output line when the supply is deactivated. The output lines are protected from overpressurization by Relief Valve A5189.

1.2.4.6 Launcher Supply. Opening Manual Valve A5165 allows GN_2 at 3000 psig to flow into Pressure Regulators A5166 and A5167. Pressure Regulator A5166 is preset for a 750-psig output which is applied to the dome of Pressure Regulator A5167. Pressure Regulator A5167 then reduces the mainstream 3000-psig GN_2 to 750 psig. The 750-psig GN_2 output is routed to launcher Manual Valve A5177. The output line is protected from overpressurization by Relief Valve A5168. The 750-psig GN_2 output is monitored by Pressure Gage A5176 and by Pressure Switch A5174 through Shuttle Valve A5173. The line is bled by Manual Valve A5171 through Check Valve A5172 into Vent Manifold A5255 when the supply is deactivated. When Manual Valve A5177 is opened, the 750-psig GN_2 is routed to the launcher. The output pressure is monitored by Pressure Gage A5183, and by Pressure Switch A5181 through Shuttle Valve A5180. The launcher supply line is bled by Manual Valve A5178 through Check Valve A5179 into Vent Manifold A5255 when operations are complete.

The GN_2 supply to the launcher is distributed by a 3/4-inch diameter line which circles the launcher. The line supplies 750-psig GN_2 to solenoid valves which control vehicle servicing operations and operation of the umbilical masts as follows:

Energize Solenoid Valves	Supply 750-psig GN_2 to	Purpose
A5602, A5603	short cable mast No. 2	actuate mast release circuits
A5617	S-I stage fuel fill and drain valve	open valve
A5605, A5606	short cable mast No. 4	actuate mast release circuits
A5616	S-I stage LOX fill and drain valve	open valve
A5618	S-I stage LOX replenishing valve	open valve

Energize Solenoid Valves	Supply 750-psig GN_2 to	Purpose
A5600	fuel mast valve box	purge
A5601	fuel mast valve box	release fuel mast; test operation of fuel mast.
A5604	LOX mast valve box	release LOX mast; test operation of LOX mast.

GN_2 at 750 psig is also routed directly from the launcher to the replenish LOX storage facility and the environmental conditioning system to actuate pneumatic valves within the respective areas.

1.2.4.7 LOX Tank Pressurization Supply. The LOX tank pressurization supply is used to pressurize the S-I stage LOX tanks just before launch. Opening Manual Valve A5242 allows helium at 3000 psig to flow to Solenoid Valves A6028 and A6029. When the solenoid valves are energized, the helium passes through the solenoid valves and Orifices A6068 and A6069 to a quick-disconnect coupling (A6508, volume II) at short cable mast No. 2. Pressure Switch A5291 monitors the output line. The helium output line can be pressurized with GN_2 at 3000 psig through Manual Valves A5254 and A5292 when pressure only is needed for checking components. Manual Valve A5288 bleeds the GN_2 and helium output lines through Check Valve A5293 into Vent Manifold A5255 when used in conjunction with Manual Valves A5254 and A5292.

1.2.4.8 LOX Tanking Computer Bottom Sensor Supply. The LOX tanking computer bottom sensor supply is used to activate the bottom LOX sensor for the LOX tanking computer. Opening Manual Valve A5289 allows helium at 3000 psig to flow to Pressure Regulator A5280. The regulator reduces the pressure to 450 psig and the output is routed through Orifice A6070 and A6071 to Solenoid Valve A6030. When the solenoid valve is energized, 450-psig helium is supplied to the LOX tanking computer and a quick-disconnect coupling (A6605, volume II) on short cable mast No. 4. Pressure in the output line is monitored by Pressure Gage A5281 and Pressure Switch A6031. Relief Valve A5296 protects the line from overpressurization. When operations are complete, the output line can be bled by Manual Valve A5290 through Check Valve A5294 into Vent Manifold A5255.

1.2.4.9 LOX Tank Bubbling Supply (Figure 3-4). The LOX tank bubbling supply is used to agitate LOX in the S-I stage tanks and engine suction lines just before launch. Opening Manual Valve A5268 allows helium at 3000 psig to flow to Pressure Regulators A5244 and A5245. Pressure Regulator A5244 is preset to 315 psig and supplies the dome of Pressure Regulator A5245 which then reduces the mainstream 3000-psig helium to 315 psig. The output from Pressure Regulator A5245 is routed to Solenoid Valve A5607 on the launcher. When the solenoid valve is energized, 315-psig helium flows through a quick-disconnect coupling (A6610, volume II) at short cable mast No. 4 and into the S-I stage. The output line is protected from overpressurization by Relief Valve A5246. The line can be bled by Manual Valve A5247 through Check Valve

A5248 into Vent Manifold A5255. Pressure in the output line is monitored by Pressure Switch A5250 through Shuttle Valve A5249, and by Pressure Gage A5252.

1.2.4.10 Holddown Arms Release Control Panel Supply. The holddown arms release control panel supply is used to release the holddown arms so that the vehicle is free to lift off the launcher. Opening Manual Valve A5269 allows helium at 3000 psig to flow to Pressure Regulators A5270 and A5271. Pressure Regulator A5271 is preset to 750 psig and supplies the dome of Pressure Regulator A5270 which then reduces the 3000-psig helium to 750 psig. The output from Pressure Regulator A5270 is routed to the holddown arms release control panel on the launcher. The output line is protected from overpressurization by Relief Valve A5273. The line can be bled by Manual Valve A5272 through Check Valve A5188 into Vent Manifold A5255. Pressure in the output line is monitored by Pressure Switch A5275 through Shuttle Valve A5274 and by Pressure Gage A5277.

1.2.5 Valve Panel A Operation - Valve panel A (figure 3-6) receives helium at 6000 psig from the PCD. The panel reduces and regulates the pressure and supplies helium to the S-IV stage control pressure system, the launch complex purge circuits, and to the helium cooler heat exchanger. Valve panel A also receives a supply of GN_2 at 6000 psig from valve panel B. The GN_2 supply can be used instead of the helium supply when system test and checkout is performed and thus conserve the helium supply.

Opening Manual Valve A2300 allows helium at 6000 psig to flow into valve panel A through Filter A2302 past monitoring Pressure Transducer A2304 and Pressure Gage A2306 to Solenoid Valve A2312. Snubber A2308 protects the gage against slamming. When Solenoid Valve A2312 is energized, the 6000-psig helium flows past venting Solenoid Valve A2314, through Check Valve A2316, and is then branched to Manual Valves A2343 and A2324. During operations, Solenoid Valve A2314 is energized to close the venting port; Snubber A2385 keeps foreign matter from entering the venting port of the valve. The branch line to Manual Valves A2343 and A2324 can also be supplied with 6000-psig GN_2 from valve panel B, through Solenoid Valve A2320 and Check Valve A2317. The 6000-psig GN_2 supply line may be vented through Manual Valve A2375 and Orifice A2322. Solenoid Valve A2318 and Snubber A2319 also vent the GN_2 supply lines. The GN_2 supply to valve panel A is activated for system tests and checkout to conserve helium. The following paragraphs explain the distribution paths through the valve panel.

1.2.5.1 S-IV Stage Control Pressure System Supply. Opening Manual Valve A2343 allows helium at 6000 psig to flow to Pressure Regulators A2344 and A2349. Pressure Regulator A2344 is remotely adjusted for an output of 3000 psig to load the dome of Pressure Regulator A2349. The dome supply is monitored by Pressure Transducer A2347 and Pressure Gage A2345. Snubber A2346 protects the gage against slamming. Pressure Regulator A2349 reduces the mainstream helium supply to 3000 psig in accordance with the dome load. The output is routed past monitoring Pressure Transducer A2378 and Pressure Gage A2380, then past Relief Valve A2381 to Solenoid Valve A2383. Snubber A2379 protects the gage against slamming. The output line can be vented through Manual Valve A2382. When Solenoid Valve A2383 is energized, 3000-psig helium flows through Filter A2384, through Quick-Disconnect Couplings A3156 and E200 (figure 3-7), through Check Valves E282 and E217 into Storage Sphere E218, and

through Check Valve E201 into Storage Sphere E202. The helium supply in Storage Sphere E218 is monitored by Pressure Switch E315. The supply is routed through a controlling solenoid valve (E257, volume III) to the LH_2 container to maintain the container pressure.

The helium supply in Storage Sphere E202 is used to actuate pneumatic valves on the S-IV stage. Pressure Switch E219 monitors the pressure in the sphere and transmits a pressure OK signal to the launch complex. Relief Valve E204 protects the storage sphere and high-pressure system against overpressurization. When necessary, the storage sphere can be vented by Solenoid Valve E203. The high-pressure supply flows from the sphere, through 10-micron Filter E205, and through Solenoid Valve E207 to Pressure Regulator E206. The regulator reduces the pressure to 455 psig and the output is routed past monitoring Pressure Switches E208-1, E208-2, and E220 to Plenum Sphere E271. The plenum sphere reduces the pressure fluctuations caused by the actuating valves demands on the pressure system. From the plenum sphere, control pressure is supplied to solenoid valves in the LOX system (volume II), in the LH_2 system (volume III), and in the engine system (volume IX).

1.2.5.2 GH_2 Vent Duct and Fuel Injector Purges. The GH_2 vent duct purge is a helium purge of three ducts which vent chilldown GH_2 from the RL10A-3 engines. The three ducts extend the length of the S-IV aft interstage and the S-I stage and exit through three of the four stub fins.

The ducts are purged with helium from Storage Sphere B422 in the S-I stage. The storage sphere is filled with helium at 3000 psig through a branch line from the control pressure system charging line. The purge supply is routed from the storage sphere through Check Valve E262, Solenoid Valve E264, bypass Orifice E263, Orifice E267, and Orifice E268 (volume IX) into the GH_2 vent ducts. Bypass Orifice E263 maintains a low-pressure purge in the ducts until Solenoid Valve E264 is deenergized for full purge.

The GH_2 vent duct purge begins approximately 2 hours before launch when Storage Sphere B422 is charged to 1500 psig. Solenoid Valve E264 is energized at the same time so that only a low-pressure purge through bypass Orifice E263 is conducted. Approximately 60 minutes before launch, the storage sphere is pressurized to 3000 psig and the purge rate is increased. The purge continues at the intermediate rate until the vehicle is launched. At liftoff, Solenoid Valve E264 is deenergized and the normally open port allows full purge. The full purge continues until Quick-Disconnect Couplings E266 and E272 are uncoupled at stage separation.

The fuel injector purge starts simultaneously with the GH_2 vent duct purge. Helium is routed from valve panel A through Quick-Disconnect Couplings A3156 and E200, Check Valve E44 (volume IX), and Orifice E37 (volume IX) into a ringline manifold. The purge is then distributed through individual lines to each of the six RL10A-3 engines.

1.2.5.3 Purge Supply (Figure 3-6). Opening Manual Valve A2350 allows helium at 3000 psig to flow to Pressure Regulators A2351 and A2355. Pressure Regulator A2351 is manually adjusted for a 500-psig output to load the dome of Pressure Regulator

A2355. The dome supply is monitored by Pressure Gage A2352. Snubber A2353 protects the gage against slamming. Pressure Regulator A2355 reduces the mainstream helium supply to 500 psig in accordance with the dome load. The output is routed past monitoring Pressure Transducer A2357 and Pressure Gage A2359 to Pressure Regulators A2360 and A2364. Snubber A2358 protects the gage against slamming. Pressure Regulator A2360 is manually adjusted for a 50-psig output to load the dome of Pressure Regulator A2364. The dome supply is monitored by Pressure Gage A2361. Snubber A2362 protects the gage against slamming. Pressure Regulator A2364 reduces the mainstream helium supply to 50 psig in accordance with the dome load. The output is routed past monitoring Pressure Transducer A2366 and Pressure Gage A2368 to the distribution line. Snubber A2367 protects the gage against slamming. The output line is protected from overpressurization by Relief Valve A2370. The output line can be vented by opening Manual Valve A2369. The 50-psig helium output is routed through Solenoid Valve A2371 and Orifice A2372 to swing arm No. 2 to purge LH_2 transfer equipment (volume III). The helium output is also supplied through Solenoid Valve A2321 and Filter A2376 to swing arm No. 2 to purge the LH_2 transfer line (volume III). Manual Valve A2386 admits the 50-psig helium to swing arm No. 3 to purge the GH_2 vent line (volume III).

1.2.5.4 Helium Cooler Heat Exchanger Supply. Opening Manual Valve A2324 allows helium at 6000 psig to flow to Pressure Regulators A2325 and A2330. Pressure Regulator A2325 is remotely adjusted through a motor-driven, internal loader. Normally, the regulator is set for a 3000-psig output. During the S-IV stage propellant loading operation, however, the line supplies a 1000-psig helium purge to the S-IV stage LH_2 container. At that time, Pressure Regulator A2325 is set for a 1000-psig output. The dome supply is monitored by Pressure Transducer A2328 and Pressure Gage A2326. Snubber A2327 protects the gage against slamming. Pressure Regulator A2330 reduces the mainstream helium supply to 1000 or 3000 psig in accordance with the dome load. The output is routed past monitoring Pressure Transducer A2333 and Pressure Gage A2335 to the helium cooler heat exchanger. Snubber A2334 protects the gage against slamming. The output line is protected from overpressurization by Relief Valve A2331. The output line can be vented by opening Manual Valve A2336.

1.2.6 Helium Cooler Heat Exchanger Operation - The helium cooler (figure 3-6) receives helium at ambient temperature and at 1000 or 3000 psig from valve panel A. LH_2 is used to cool the helium supply to valve panel B. The cold helium at 1000 psig is used to purge the S-IV stage LH_2 container. The cold helium at 3000 psig is used to fill cold helium storage spheres on the S-IV stage and to pressurize the S-IV stage LH_2 container prior to flight.

The ambient helium passes through Helium Cooler Heat Exchanger A3950 through a coil immersed in LH_2. The LH_2 surrounds the coil and cools the helium to -410F; Temperature Sensor A3952 monitors the temperature of the cold helium leaving the helium cooler. LH_2 for operation of the cooler is received from the LH_2 main fill and replenish control (volume III). Liquid Level Sensor A3951 monitors the level of LH_2 within the cooler and transmits demand signals to the LH_2 main fill and replenish control system. Gaseous hydrogen boiloff from the cooler is vented through a check valve (A3377, volume III) to the LH_2 burn pond. Pressure in the jacket of the cooler

is monitored by Pressure Transducer A3953. The jacket can be vented through Manual Valve A3954.

1.2.7 Valve Panel B Operation - Valve panel B (figure 3-6) receives GN_2 at 6000 psig from the PCD. The panel reduces and regulates the GN_2 pressure and distributes the output to the S-IV stage LOX transfer and LH_2 transfer equipment. Valve panel B also receives a supply of helium at 1000 or 3000 psig from the helium cooler heat exchanger for transfer to the S-IV stage.

Opening Manual Valve A2519 allows GN_2 at 6000 psig to flow into valve panel B through Filter A2520, past monitoring Pressure Transducer A2521 and Pressure Gage A2522 to Pressure Regulators A2527 and A2529. Snubber A2523 protects the gage against slamming. The 6000-psig input is also supplied to valve panel A through a branch line downstream of the filter. The input line can be vented through Manual Valve A2525, Orifice A2526, and Snubber A2588. Pressure Regulator A2527 is manually adjusted for a 3000-psig output to load the dome of Pressure Regulator A2529. The dome supply is monitored by Pressure Gage A2528. Snubber A2530 protects the gage against slamming. Pressure Regulator A2529 reduces the mainstream GN_2 supply to 3000 psig in accordance with the dome load. The output is routed past monitoring Pressure Transducer A2535 and Pressure Gage A2532 to Pressure Regulator A2536, and through Orifice A2591 to Pressure Regulator A2540. Snubber A2533 protects the gage against slamming. Pressure Regulator A2536 is manually adjusted for a 750-psig output to load the dome of Pressure Regulator A2540. The dome supply is monitored by Pressure Gage A2537. Snubber A2538 protects the gage against slamming. Pressure Regulator A2540 reduces the mainstream GN_2 supply to 750 psig in accordance with the dome load. The output is routed past monitoring Pressure Transducer A2544 and Pressure Gage A2543 to Manual Valve A2549 and Solenoid Valve A2546. Snubber A2542 protects the gage against slamming. The output line is protected from overpressurization by Relief Valve A2545; the line can be vented by opening Manual Valve A2548. The following paragraphs explain the distribution paths through the valve panel.

1.2.7.1 Purge Supply. Opening Manual Valve A2549 allows GN_2 at 750 psig to flow to Pressure Regulator A2550 and through Orifice A2592 to Pressure Regulator A2551. Pressure Regulator A2550 is manually adjusted for a 50-psig output to load the dome of Pressure Regulator A2551. The dome supply is monitored by Pressure Gage A2554. Snubber A2553 protects the gage against slamming. Pressure Regulator A2551 reduces the mainstream GN_2 supply to 50 psig in accordance with the dome load. The output is routed past monitoring Pressure Transducer A2555 and Pressure Gage A2556 to Solenoid Valves A2561 and A2563. Snubber A2557 protects the gage against slamming. The output line is protected from overpressurization by Relief Valve A2559; the line can be vented by opening Manual Valve A2560. When Solenoid Valve A2561 is energized, the 50-psig GN_2 output is supplied through Filter A2562 to swing arm No. 2 to purge the S-IV stage LOX transfer line (volume II). When Solenoid Valve A2563 is opened, 50-psig GN_2 is supplied to swing arm No. 2 to purge the umbilical housing (volume VII), and the LOX transfer equipment (volume II).

1.2.7.2 Control Pressure Supply. Energizing Solenoid Valve A2546 allows GN_2 at 750 psig to flow through Filter A2547 to solenoid valves which control the actuation

of pnemuatic valves. One branch of the output is supplied to swing arm No. 3 for actuation of the GH_2 vent release (volume VII). A second branch supplies the 750-psig GN_2 output to the LH_2 main fill and replenish control (volume III) and to the LOX fill and replenish control (volume II). The 750-psig GN_2 is also used within valve panel B to control the cold helium supply lines.

1.2.7.3 Cold Helium Supply. Two supply lines of cold helium are routed through valve panel B. The cryogenic helium is supplied to valve panel B by helium cooler heat exchanger. Pneumatic valves which control the pressurized flow in the supply lines receive their actuating pressure from within the valve panel.

When Solenoid Valve A2584 is energized, GN_2 at 750 psig opens Pneumatic Valve A2583. Cryogenic helium at 3000 psig then flows through Orifice A2582, Pneumatic Valve A2583, and Filter A2587 to swing arm No. 2 to fill the cold helium storage spheres in the S-IV stage (volume II). The output line can be vented by energizing Solenoid Valve A2585 so that 750-psig GN_2 will open Pneumatic Valve A2586.

When Solenoid Valve A2578 is energized, GN_2 at 750 psig opens Pneumatic Valve A2539. Cryogenic helium at 1000 or 3000 psig then flows through Orifice A2581, Pneumatic Valve A2539, Check Valve A2580, Manual Valve A2573, and Filter A2574 to swing arm No. 2. When the helium is at 1000 psig, the supply is used to purge the S-IV stage LH_2 tank. When the helium is at 3000 psig, the supply is used to pressurize the LH_2 tank (volume III). The output line can be vented by energizing Solenoid Valve A2577 so that 750-psig GN_2 will open Pneumatic Valve A2576. The output line can also be vented by opening Manual Valve A2575.

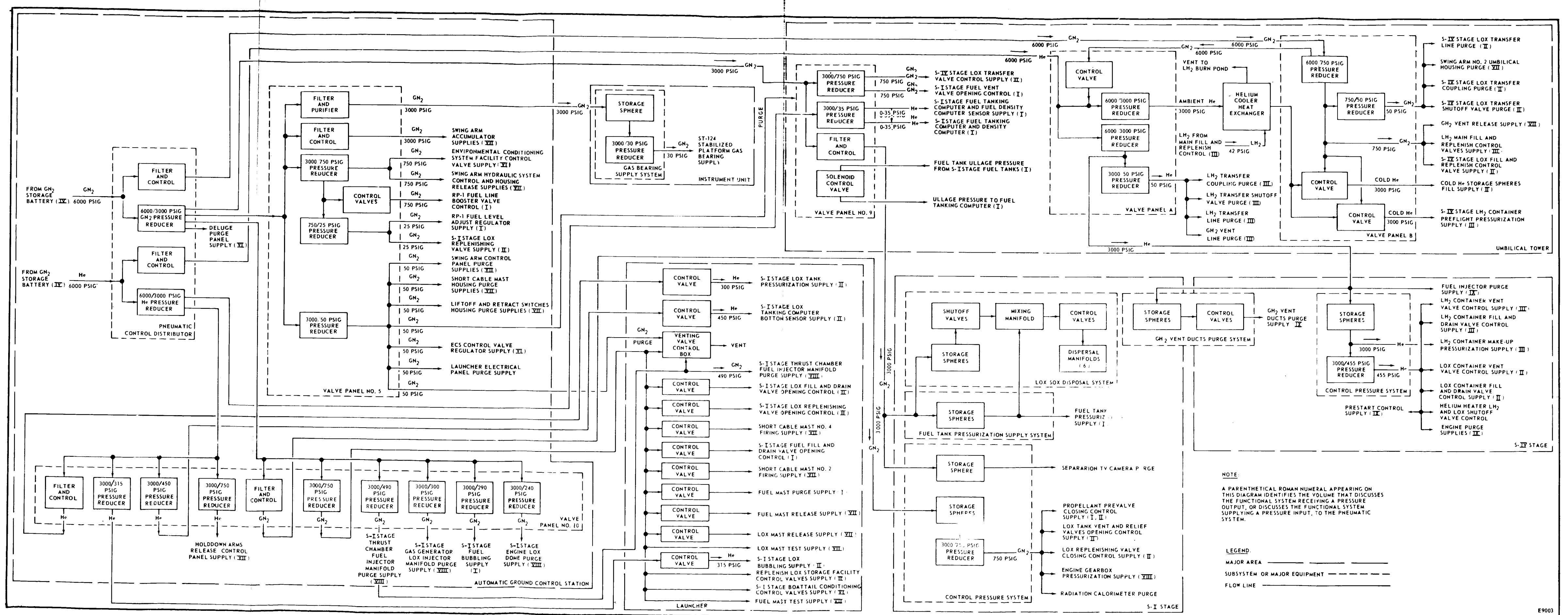

Figure 1-1. Pneumatic Distribution System - Block Diagram

SECTION 2

INDEX OF FINDING NUMBERS

This section contains an alpha-numerical list, by finding number, of the pneumatic distribution system components that function during a prelaunch countdown, during vehicle flight, or in the event of a launch abort. The finding numbers listed identify components on system mechanical schematics provided in section 3. Additional columns in the index of finding numbers provide such pertinent information as component description and function, part number, and the supplier's name and part number. A break will occur in the alpha-numeric sequence of finding numbers when a component, or component series is non-functional during the countdown, functional only in the event of a malfunction, functional in terms of a maintenance operation only, or is part of another functional system.

The letter prefix of a finding number identifies the component location with respect to either the launch complex or an area of the launch vehicle. The letter prefixes used in this eleven-volume set are listed below.

FINDING NUMBER PREFIX	DESIGNATED AREA
A	Launch complex
B	S-I stage
E	S-IV stage
G	Instrument unit
H	Payload

Finding Number	Reqd	Component	Remarks	Vendor	Drawing Number	Elec. Sym.
A1451	1	Valve, Relief	Relieves at 8000 (±200) psig; reseats at 6800 psig min	Fluid Mechanics P/N 2-920	75M50302	
A1452	1	Valve, Manual	2 in., with position indicators	Annin Company P/N 6510	75M50304	59A11
A1453	1	Filter	10 micron, 98 percent nominal	Bendix P/N 047213	75M50154-1	
A1454 and A1455 are not functionally applicable to this system.						
A1456	1	Valve, Relief	Relieves at 3350 (±150) psig; reseats at 3200 psig min	Cornelius P/N 116B100-2	75M50311-2	
A1457	1	Regulator, Pressure	Dome-loaded; 6000 psig inlet, 3000 psig outlet	Grove P/N 10977HS08HR088D	75M50305-4	
A1458	1	Regulator, Pressure	Dome-loaded; 6000 psig inlet, 3000 psig outlet	Grove P/N 10977HS08HR085D	75M50305-1	
A1459	1	Valve, Manual	2 in., with position indicators	Annin Company P/N 4510-2	75M50306-2	59A21
A1460 is not functionally applicable to this system.						
A1461	1	Orifice	0.031 (+0.002, -0.001) in. dia	Rocketdyne P/N 9504-45062	10430000	
A1462	1	Muffler	3/8 in.	C.W. Morris Company P/N AA-3	10434141-2	
A1463	1	Valve, Solenoid	1/4 in., 3-way, N.O.	Marotta P/N 202873-113 (MV74)	75M01351	55A10A

Finding Number	Reqd	Component	Remarks	Vendor	Drawing Number	Elec. Sym.
A1464	1	Gage, Pressure	0 to 5000 psig range; 3000 psig normal indication	Marsh P/N 210-3SSFMH	75M50147-15	
A1465	1	Valve, Check	1/4 in, cracking pressure 4 psig max	James, Pond & Clark P/N H249T1-4TT	10430234-1	
A1466	1	Valve, Manual	1/4 in.	Robbins P/N SSNA250-4T-787	75M01305-1	
A1467	1	Regulator, Pressure	Internally-loaded, adjustable; 6000 psig inlet, 3000 psig outlet	Grove P/N 10931MA2B	75M50165-13	
A1468	1	Gage, Pressure	0 to 10,000 psig range; 6000 psig normal indication	Marsh P/N 210-3SSFMH	75M50147-18	
A1469	1	Transducer, Pressure	3000 to 6000 psig range; 6000 psig normal indication	Giannini P/N 46155NR-G-600-20	75M50148-2	55A10A6
A1470 is not functionally applicable to this system.						
A1471	1	Valve, Manual	1/4 in.	Futurecraft P/N 30404S	75M50161-1	
A1472 is not functionally applicable to this system.						
A1473	1	Valve, Manual	1/4 in.	Futurecraft P/N 30404S	75M50161-1	
A1474 is not functionally applicable to this system.						
A1475	1	Valve, Relief	Relieves at 8000 (±200) psig; reseats at 6800 psig min	Fluid Mechanics P/N 2-920	75M50302	

Finding Number	Reqd	Component	Remarks	Vendor	Drawing Number	Elec. Sym.
A1476	1	Valve, Manual	2 in., with position indicators	Annin Company P/N 6510	75M50304	59A12
A1477	1	Filter	10 micron, 98 percent nominal	Bendix P/N 047213	75M50154-1	
A1478 and A1479 are not functionally applicable to this system.						
A1480	1	Valve, Relief	Relieves at 3350 (± 150) psig; reseats at 3200 psig min.	Cornelius P/N 116B100-2	75M50311-2	
A1481	1	Regulator, Pressure	Dome-loaded; 6000 psig inlet, 3000 psig outlet	Grove P/N 10977HS08HR088D	75M50305-4	
A1482	1	Regulator, Pressure	Dome-loaded; 6000 psig inlet, 3000 psig outlet	Grove P/N 10977HS0HR088D	75M50305-4	
A1483	1	Valve, Manual	2 in., with position indicators	Annin Company P/N 4510	75M50306-3	59A22
A1484 is not functionally applicable to this system.						
A1485	1	Orifice	0.031 in. dia. (+0.002, -0.001)	Rocketdyne P/N 9504-45062	10430000	
A1486	1	Muffler	3/8 in.	C. W. Morris Company P/N AA-3	1034141-2	
A1487	1	Valve, Solenoid	1/4 in., 3-way, N.O.	Marotta P/N 202873-113	75M01351	55A10A7
A1488	1	Gage, Pressure	0 to 5000 psig range; 3000 psig normal indication	Marsh P/N 210-3SSFMH	75M50147-15	

Finding Number	Reqd	Component	Remarks	Vendor	Drawing Number	Elec. Sym.
A1489	1	Valve, Check	1/4 in., cracking pressure 4 psig max.	James, Pond &Clark P/N H249T1-4TT	10430234-1	
A1490	1	Valve, Manual	1/4 in.	Robbins P/N SSNA250-4T-787	75M01305-1	
A1491	1	Regulator, Pressure	Internally-loaded, adjustable; 6000 psig inlet, 3000 psig outlet	Grove P/N 10931MA2B	75M50165-13	
A1492	1	Valve, Manual	1/4 in.	Futurecraft P/N 30404S	75M50161-1	
A1493 is not functionally applicable to this system.						
A1494	1	Valve, Manual	1/4 in.	Futurecraft P/N 30404S	75M50161-1	
A1495 is not functionally applicable to this system.						
A1496	1	Valve, Relief	Relieves at 8000 (± 200) psig; reseats at 6800 psig min.	Fluid Mechanics P/N 2-920	75M50302	
A1497	1	Valve, Manual	2 in., with position indicators	Annin Company P/N 6510	75M50304	59A13
A1498	1	Filter	10 micron, 98 percent nominal	Bendix P/N 047213	75M50154	
A1499 is not functionally applicable to this system.						
A1500	1	Valve, Manual	1/4 in.	Flodyne, P/N 2A11	75M51077-1	

Finding Number	Reqd	Component	Remarks	Vendor	Drawing Number	Elec. Sym.
A1501	1	Valve, Manual	1/4 in.	Flodyne P/N 2A11	75M51077-1	
A1502 and A1503 are not functionally applicable to this system.						
A1504	1	Valve, Relief	Relieves at 3350 (± 150) psig; reseats at 3200 psig min	Cornelius P/N 116B100-2	75M50311-2	
A1505	1	Regulator, Pressure	Dome-loaded; 6000 psig inlet, 3000 psig outlet	Grove P/N 10977HS08HR088D	75M50305-4	
A1506	1	Regulator, Pressure	Dome-loaded; 6000 psig inlet, 3000 psig outlet	Grove P/N 10977HS08HR088D	75M50305-4	
A1507	1	Valve, Manual	2 in., with position indicators	Annin Company P/N 4510	75M50306-3	59A23
A1508	1	Valve, Check	1/4 in., cracking pressure 4 psig max	James, Pond &Clark P/N H299T1-4TT	10430233-1	
A1509	1	Manifold, Vent	6000 psig GN_2 and He vent			
A1510 through A1513 are not functionally applicable to this system.						
A1514	1	Muffler	6000 psig vent manifold discharge silencer		75M50787	
A1515 is not functionally applicable to this system.						
A1516	1	Valve, Manual	1/4 in.	Futurecraft P/N 30412S	75M50161-7	

Finding Number	Reqd	Component	Remarks	Vendor	Drawing Number	Elec. Sym.
A1517 is not functionally applicable to this system.						
A1518	1	Gage, Pressure	0 to 10,000 psig range; 6000 psig normal indication	Marsh P/N 210-3SSFMH	75M50147-18	
A1519	1	Valve, Manual	1/4 in.	Futurecraft P/N 30404S	75M50161-1	
A1520 through 1523 are not functionally applicable to this system.						
A1524	1	Transducer, Pressure	0 to 4000 psig range; 3000 psig normal indication	Giannini P/N 46155NR-G-400-20	75M50148-1	55A10A8
A1525	1	Gage, Pressure	0 to 5000 psig range; 3000 psig, normal indication	Marsh P/N 210-3SSFMH	75M50147-15	
A1526	1	Valve, Relief	Relieves at 3500 (± 100) psig; reseats at 3200 psig min.	Fluid Mechanics P/N 2-916	10430216-5	
A1527	1	Valve, Relief	Relieves at 3500 (± 100) psig; reseats at 3200 psig min.	Fluid Mechanics P/N 2-916	10430216-5	
A1528	1	Valve, Check	1 in., cracking pressure 4 psig max	James, Pond &Clark P/N H249T1-16TT	10430234-5	
A1529	1	Valve, Manual	1 in.,	Futurecraft P/N 30416S	75M50161-9	
A1530 and A1531 are not functionally applicable to this system.						
A1532	1	Valve, Manual	1 in.	Futurecraft P/N 30416S	75M50161-9	
A1533	1	Valve, Manual	1 in.	Futurecraft P/N 30416S	75M50161-9	

Finding Number	Reqd	Component	Remarks	Vendor	Drawing Number	Elec. Sym.
A1534	1	Valve, Manual	1 in.	Futurecraft P/N 30416S	75M50161-9	
A1535	1	Valve, Manual	1 in.	Futurecraft P/N 30416S	75M50161-9	
A1536	1	Valve, Manual	1 in.	Futurecraft P/N 30416S	75M50161-9	
A1537 through A1540 are not functionally applicable to this system.						
A1541	1	Switch, Pressure	Actuates at 15 psig	Custom P/N 8G46	10430405	55A10A11
A1542	1	Switch, Pressure	Actuates at 15 psig	Custom P/N 8G46	10430405	55A10A12
A1543	1	Switch, Pressure	Actuates at 15 psig	Custom P/N 8G46	10430405	55A10A13
A1544	1	Switch, Pressure	Actuates at 15 psig	Custom P/N 8G46	10430405	55A10A14
A1545	1	Switch, Pressure	Actuates at 15 psig	Custom P/N 8G46	10430405	55A10A15
A1546	1	Switch, Pressure	Actuates at 15 psig	Custom P/N 8G46	10430405	55A10A16
A1547 through A1558 are not functionally applicable to this system.						
A1559	1	Valve, Manual	3/8 in.	Robbins P/N NT-180	10437694	

Finding Number	Reqd	Component	Remarks	Vendor	Drawing Number	Elec. Sym.
A1560	1	Valve, Manual	3/8 in.	Robbins P/N NT-180	10437694	
A1561	1	Valve, Manual	3/8 in.	Robbins P/N NT-180	10437694	
A1562	1	Valve, Manual	3/8 in.	Robbins P/N NT-180	10437694	
A1563	1	Valve, Manual	3/8 in.	Robbins P/N NT-180	10437694	
A1564	1	Valve, Manaul	3/8 in.	Robbins P/N NT-180	10437694	
A1565 through A1567 are not functionally applicable to this system.						
A1568	1	Valve, Check	3/8 in., cracking pressure 4 psig max	James, Pond &Clark P/N H249T1-6TT	10430234-2	
A1569	1	Valve, Check	3/8 in., cracking pressure 4 psig max	James, Pond & Clark P/N H249T1-6TT	10430234-2	
A1570	1	Valve, Check	3/8 in., cracking pressure 4 psig max	James, Pond & Clark P/N H249T1-6TT	10430234-2	
A1571	1	Valve, Check	3/8 in., cracking pressure 4 psig max	James, Pond & Clark P/N H249T1-6TT	10430234-2	
A1572	1	Valve, Check	3/8 in., cracking pressure 4 psig max	James, P ond & Clark P/N H249T1-6TT	10430234-2	
A1573	1	Valve, Check	3/8 in., cracking pressure 4 psig max	James, Pond & Clark P/N H249T1-6TT	10430234-2	

Finding Number	Reqd	Component	Remarks	Vendor	Drawing Number	Elec. Sym.
A1574 through A1576 are not functionally applicable to this system.						
A1577	1	Manifold, Distribution	3000 psig GN_2		75M50178-1	
A1578 is not functionally applicable to this system.						
A1579	1	Valve, Check	3/8 in.	James, Pond & Clark P/N H249T1-6TT	10430234-2	
A1580	1	Manifold, Vent	3000 psig GN_2	75M50177	75M50177	
A1581	1	Valve, Shuttle	1/4 in., 3-way, 2-position	Clary Dynamics P/N 2682-3	10434448	
A1582 and 1583 are not functionally applicable to this system.						
A1584	1	Valve, Manual	1 in.	Futurecraft P/N 304165	75M50161-9	
A1585	1	Valve, Check	1/4 in., cracking pressure 4 psig max.	James, Pond & Clark P/N H249T1-4TT	10430234-1	
A1586	1	Valve, Check	1/4 in., cracking pressure 4 psig max.	James, Pond & Clark P/N H249T1-4TT	10430234-1	
A1587	1	Valve, Manual	2 in., with position indicators	Annin Company P/N 6510	75M50304	59A14
A1588	1	Filter	10 micron, 98 percent nominal	Bendix P/N 046020X	75M50154-1	

Finding Number	Reqd	Component	Remarks	Vendor	Drawing Number	Elec. Sym.
A1589 and A1590 are not functionally applicable to this system.						
A1591	1	Valve, Relief	Relieves at 3350 (± 150) psig; reseats at 3200 psig min	Cornelius P/N 116B100-2	75M50311-2	
A1592	1	Regulator, Pressure	Dome-loaded; 6000 psig inlet, 3000 psig outlet	Grove P/N 10977H088B	75M50305-4	
A1593	1	Regulator, Pressure	Dome-loaded; 6000 psig inlet, 3000 psig outlet	Grove P/N 1097H085B	75M50305-1	
A1594	1	Valve, Manual	2 in., with position indicators	Annin Company P/N 4510	75M50306-3	59A24
A1595 is not functionally applicable to this system.						
A1596	1	Orifice	0.031 (+0.002, -0.001) in. dia.	Rocketdyne P/N 9504-45062	10430000	
A1597	1	Muffler	3/8 in.	C. W. Morris P/N AA-3	10434141-2	
A1598	1	Valve, Solenoid	3-way; N.O.	Marotta (Model MV74) P/N 202873-113	75M01351	55A10A18
A1599	1	Gage, Pressure	0 to 5000 psig range; 3000 psig normal indication	Marsh P/N 210-3SSFMH	75M50147-15	
A1600	1	Valve, Manual	1/4 in.,	Robbins P/N SSNA-250-4T-787	75M01305-1	
A1601	1	Valve, Check	1/4 in., cracking pressure 4 psig max	James, Pond & Clark P/N H249T1-4TT	10430234-1	

Finding Number	Reqd	Component	Remarks	Vendor	Drawing Number	Elec. Sym.
A1602	1	Regulator, Pressure	Internally-loaded, adjustable; 6000 psig inlet, 3000 psig outlet	Grove P/N 10931MA2B	75M50165-13	
A1603	1	Gage, Pressure	0 to 10,000 psig range; 6000 psig normal indication	Marsh P/N 210-3SSFMH	75M50147-18	
A1604	1	Transducer, Pressure	3000 to 6000 psig range; 6000 psig normal indication	Giannini P/N 46155NR-G-600-20	75M50148-2	55A10A19
A1605 is not functionally applicable to this system						
A1606	1	Valve, Manual	1/4 in.	Futurecraft P/N 30404S	75M50161-1	
A1607 is not functionally applicable to this system.						
A1608	1	Valve, Manual	1/4 in.	Futurecraft P/N 30404S	75M50161-1	
A1609 is not functionally applicable to this system.						
A1610	1	Valve, Relief	Relieves at 8000 (± 200) psig; reseats at 6800 psig min	Fluid Mechanics P/N 2-920	75M50302	
A1611	1	Valve, Manual	2 in., with position indicators	Annin Company P/N 6510	75M50304	59A15
A1612	1	Filter	10 micron, 98 percent nominal	Bendix P/N 046020X	75M50154-1	
A1613 and A1614 are not functionally applicable to this system.						

Finding Number	Reqd	Component	Remarks	Vendor	Drawing Number	Elec. Sym.
A1615	1	Valve, Relief	Relieves at 3350 (± 150) psig; reseats at 3200 psig min.	Cornelius P/N 116B100-2	75M50311-2	
A1616	1	Regulator, Pressure	Dome-loaded; 6000 psig inlet, 3000 psig outlet	Grove P/N 10977H088B	75M50305-4	
A1617	1	Regulator, Pressure	Dome-loaded; 6000 psig inlet, 3000 psig outlet	Grove P/N 10977H088B	75M50305-4	
A1618	1	Valve, Manual	2 in., with position indicators	Annin Company P/N 4510	75M50306-3	59A25
A1619 is not functionally applicable to this system.						
A1620	1	Orifice	0.031 (+0.002, -0.001) in. dia.	Rocketdyne P/N 9504-45062	10430000	
A1621	1	Muffler	3/8 in.	C. W. Morris Company P/N AA-3	1043141-2	
A1622	1	Valve, Solenoid	3-way, N. O.	Marotta (Model MV74) P/N 202873-113	75M01351	55A10A20
A1623	1	Gage, Pressure	0 to 5000 psig range; 3000 psig normal indication	Marsh P/N 210-3SSFMH	75M50147-15	
A1624	1	Valve, Manual	1/4 in.	Robbins P/N SSNA-250-4T-787	75M01305-1	
A1625	1	Valve, Check	1/4 in., cracking pressure 4 psig max	James, Pond & Clark P/N H249T1-4TT	10430234-1	
A1626	1	Regulator, Pressure	Internally-loaded, adjustable; 6000 psig inlet, 3000 psig outlet	Grove P/N 10931MA2B	75M50165-13	

Finding Number	Reqd	Component	Remarks	Vendor	Drawing Number	Elec. Sym.
A1627	1	Valve, Manual	1/4 in.	Futurecraft P/N 30404S	75M50161-1	
A1628 is not functionally applicable to this system.						
A1629	1	Valve, Manual	1/4 in.	Futurecraft P/N 30404S	75M50161-1	
A1630 is not functionally applicable to this system.						
A1631	1	Valve, Manual	3/4 in.	Futurecraft P/N 30412S	75M50161-7	
A1632 is not functionally applicable to this system.						
A1633	1	Valve, Manual	1/4 in.	Futurecraft P/N 30404S	75M50161-1	
A1634	1	Gage, Pressure	0 to 10,000 psig range; 6000 psig normal indication	Marsh P/N 210-3SSFMH	75M50147-18	
A1635	1	Manifold, Distribution	3000 psig He		75M50178-2	
A1636 through A1639 are not functionally applicable to this system.						
A1640	1	Transducer, Pressure	0 to 4000 psig range; 3000 psig normal indication	Giannini P/N 46155NR-G-600-20	75M30148-1	55A10A21
A1641	1	Gage, Pressure	0 to 5000 psig range; 3000 psig normal indication	Marsh P/N 210-3SSFMH	75M50147-15	

Finding Number	Reqd	Component	Remarks	Vendor	Drawing Number	Elec. Sym.
A1642	1	Valve, Relief	Relieves at 3500 (± 100) psig; reseats at 3200 psig min	Fluid Mechanics P/N 2-916	10430216-5	
A1643	1	Valve, Relief	Relieves at 3500 (± 100) psig; reseats at 3200 psig min	Fluid Mechanics P/N 2-916	10430216-5	
A1644	1	Valve, Check	1 in., cracking pressure 4 psig max.	James, Pond & Clark P/N HP249T1-16TT	10430234-5	
A1645	1	Valve, Manual	1 in.	Futurecraft P/N 30416S	75M50161-9	
A1646	1	Valve, Manual	3/8 in.	Futurecraft P/N 30406S	75M50161-3	
A1647 through A1649 are not functionally applicable to this system.						
A1650	1	Valve, Manual	1 in.	Futurecraft P/N 30416S	75M50161-9	
A1651	1	Valve, Manual	1 in.	Futurecraft P/N 30416S	75M50161-9	
A1652 through A1654 are not functionally applicable to this system.						
A1655	1	Switch, Pressure	Actuates at 15 psig	Custom P/N 8G46	10430405	55A10A22
A1656 through A1658 are not functionally applicable to this system.						
A1659	1	Switch, Pressure	Actuates at 15 psig	Custom P/N 8G46	10430405	55A10A26

Finding Number	Reqd	Component	Remarks	Vendor	Drawing Number	Elec. Sym.
A1660	1	Switch, Pressure	Actuates at 15 psig	Custom P/N 8G46	10430405	55A10A27
A1661 through A1672 are not functionally applicable to this system.						
A1673	1	Valve, Manual	3/8 in., vent	Robbins P/N NT-180	10437694	
A1674 through A1676 are not functionally applicable to this system.						
A1677	1	Valve, Manual	3/8 in.	Robbins P/N NT-180	10437694	
A1678	1	Valve, Manual	3/8 in.	Robbins P/N NT-180	10437694	
A1679 through A1681 are not functionally applicable to this system.						
A1682	1	Valve, Check	3/8 in., cracking pressure 4 psig max	James, Pond & Clark P/N H249T1-5TT	10430234-2	
A1683 through A1685 are not functionally applicable to this system.						
A1686	1	Valve, Check	3/8 in., cracking pressure 4 psig max	James, Pond & Clark P/N H249T1-6TT	10430234-2	
A1687	1	Valve, Check	3/8 in., cracking pressure 4 psig max	James, Pond & Clark P/N H249T1-6TT	10430234-2	
A1688 through A1693 are not functionally applicable to this system.						

Finding Number	Reqd	Component	Remarks	Vendor	Drawing Number	Elec. Sym.
A1694	1	Valve, Manual	1 in.	Futurecraft P/N 30416S	75M50161-9	
A1695 is not functionally applicable to this system.						
A1696	1	Valve, Check	3/8 in., cracking pressure 4 psig max	James, Pond & Clark P/N H249T1-6TT	10430234-2	
A1697	1	Manifold, Vent	3000 psig He		75M50177-2	
A1698 is not functionally applicable to this system.						
A1699	1	Valve, Relief	Relieves at 8000 (± 200) psig; reseats at 6800 psig min	Fluid Mechanics P/N 2-920	75M50302	
A1700 through A2051 are not functionally applicable to this system.						
A2052	1	Filter	5 micron, 95 percent nominal	Bendix P/N 041675	10434444-3	
A2053	1	Gage, Pressure	0 to 5000 psig range; 3000 psig normal indication	Marsh P/N 210-3SSFMH	75M147-15	
A2054	1	Manifold, Distribution	3000 psig GN_2		75M50175-1	
A2055	1	Valve, Manual	1/2 in.	Marotta P/N 223143-3	75M50164-3	
A2056	1	Regulator Pressure	Internally-loaded, adjustable; 3000 psig inlet, 50 psig outlet	Wallace O. Leonard P/N 146050-27	10437835-2	

Finding Number	Reqd	Component	Remarks	Vendor	Drawing Number	Elec. Sym.
A2057	1	Regulator Pressure	Dome-loaded; 3000 psig inlet, 50 psig outlet	Marotta P/N 226944-1	75M51102-1	
A2058	1	Valve, Relief	Relieves at 60 (± 3) psig; reseats at 54 psig min	Fluid Mechanics P/N 2-846	10430216-6	
A2059	1	Gage Pressure	0 to 100 psig range 50 psig normal indication	Marsh P/N 210-CSFMH	75M50147-4	
A2060	1	Valve, Shuttle	1/4 in.	Clary Dynamics P/N 524255	10434448	
A2061	1	Switch, Pressure	Actuates at 35 (±0.75) psig; deactuates at 2 psig below actuation pressure	Southwestern P/N 3704-35	10434297-3	55A5A10
A2062 is not functionally applicable to this system.						
A2063	1	Valve, Manual	1/4 in.	Robbins P/N SSNA-250-4T-787	75M01305-1	
A2064 and A2065 are not functionally applicable to this system.						
A2066	1	Valve, Manual	1/2 in.	Marotta P/N 223143-3	75M51064-3	
A2067	1	Valve, Manual	1/4 in.	Robbins P/N SSNA-250-4T-787	75M01305-1	
A2068	1	Valve, Check	1/4 in., cracking pressure 4 psig max	James, Pond & Clark P/N H299T1-4TT	10430233-1	
A2069 and A2070 are not functionally applicable to this system.						

Finding Number	Reqd	Component	Remarks	Vendor	Drawing Number	Elec. Sym.
A2071	1	Filter	2 micron, 95 percent nominal	Bendix P/N D047309	10434444-1	
A2072	1	Valve, Check	1/4 in., cracking pressure 4 psig max	James, Pond & Clark P/N H299T1-4TT	10430233-1	
A2073 through A2076 are not functionally applicable to this system.						
A2077	1	Valve, Manual	3/8 in.	Robbins P/N SSNA-375A-6T-768	75M01305-2	
A2078 is not functionally applicable to this system.						
A2079	1	Valve, Check	3/8 in., cracking pressure 4 psig max	James, Pond & Clark P/N H299T1-6TT	10430233-2	
A2080	1	Filter, Mechanical	10 micron, water separator	Robbins P/N RAF-2SPEF-769	75M50173-1	
A2081	1	Purifier	Oil vapor removed to 1 ppm; dries to dewpoint of -100 F	Robbins P/N RAF-2SP-769 & RAF-SPT-13X	75M50174-1 and -2	
A2082	1	Orifice	0.084 (± 0.001) in. dia., restricts to 275 scfm	A. U. Stone P/N H93C- .084	75M50184-4	
A2083	1	Valve, Solenoid	3/8 in., NC	Marotta (MV1307) P/N 212783-1	10437739	55A5A7
A2084	1	Valve, Manual	3/8 in.	Robbins P/N SSNA-375A-6T-768	75M01305-2	
A2085	1	Valve, Manual	1/4 in.	Robbins P/N SSNA-250-4T-787	75M01305-1	

Finding Number	Reqd	Component	Remarks	Vendor	Drawing Number	Elec. Sym.
A2086	1	Outlet, Test			AN833-4C	
A2087	1	Valve, Manual	1/4 in.	Robbins P/N SSNA-250-4T-787	75M01305-1	
A2088	1	Valve, Check	1/4 in., cracking pressure 4 psig max	James, Pond & Clark P/N H299T1-4TT	10430233-1	
A2089 is not functionally applicable to this system.						
A2090	1	Regulator, Pressure	Internally-loaded, adjustable; 3000 psig inlet, 750 psig outlet	Wallace O. Leonard P/N 187040-2	75M50182	
A2091	1	Regulator, Pressure	Dome-loaded; 3000 psig inlet, 750 psig outlet	Grove P/N 10988A068B	75M01356-2	
A2092	1	Manifold, Distribution	750 psig GN_2		75M50175-2	
A2093	1	Valve, Relief	Relieves at 875 (± 44) psig; reseats at 790 psig min	Fluid Mechanics P/N 2-847	10430216-3	
A2094	1	Gage, Pressure	0 to 1000 psig range; 750 psig normal indication	Fluid Mechanics P/N 210-3SSFMH	75M50147-11	
A2095	1	Valve Shuttle	1/4 in., 3-way, 2-position	Clary Dynamics P/N 524255	10434448	
A2096	1	Switch, Pressure	Actuates at 625 (±25) psig; deactuates at 50 psig below actuation pressure	Southwestern Indus. Inc. P/N PS5116-625	10434443-6	55A5A5
A2097 is not functionally applicable to this system.						

Finding Number	Reqd	Component	Remarks	Vendor	Drawing Number	Elec. Sym.
A2098	1	Valve, Manual	1/4 in.	Robbins P/N SSNA-250-4T-787	75M01305-1	
A2099	1	Valve, Check	1/4 in., cracking pressure 4 psig. max	James, Pond & Clark P/N H299T1-4TT	10430233-1	
A2100 and A2101 are not functionally applicable to this system.						
A2102	1	Purifier	Oil vapor removed to 1 ppm; dries to dewpoint of -100F	Robbins P/N RAF-2SP-769, RAF-SPT-13X	75M50174-1 and -2	
A2103	1	Purifier	Oil vapor removed to 1 ppm; dries to dewpoint of -100F	Robbins P/N RAF-2SP-769, RAF-SPT-13X	75M40174-1 and -2	
A2104 through A2107 are not functionally applicable to this system.						
A2108	1	Valve, Manual	3/8 in.	Robbins P/N SSNA-375A-6T-768	75M01305-2	
A2109	1	Regulator, Pressure	Internally-loaded adjustable; 750 psig inlet, 25 (± 2) psig outlet	Wallace O. Leonard P/N 146050-23	10437835-1	
A2110	1	Valve, Relief	Relieves at 40 (± 2) psig; reseats at 33 psig min	James, Pond & Clark P/N 5159T1-6TB-40	10430079-1	
A2111	1	Gage, Pressure	0 to 60 psig range; 25 psig normal indication	Marsh P/N 210-CSFMH	75M50147-3	
A2112	1	Valve, Shuttle	1/4 in., 3-way, 2-position	Clary Dynamics P/N 524255	10434448	
A2113	1	Switch, Pressure	Actuates at 21.5 (±0.5) psig deactuates at 1.5 psig below actuation pressure	Southwestern Indus. Inc. P/N PS5116-185	1043297-4	55A5A4

Finding Number	Reqd	Component	Remarks	Vendor	Drawing Number	Elec. Sym.
A2114 is not functionally applicable to this system.						
A2115	1	Valve, Manual	1/4 in.	Robbins P/N SSNA-250-4T-787	75M01305-1	
A2116	1	Muffler	1/2 in.	C. W. Morris P/N AA-4	1043141-1	
A2117 and A2118 are not functionally applicable to this system.						
A2119	1	Valve, Manual	1/2 in.	Marotta P/N 223143-3	75M51064-3	
A2120	1	Regulator, Pressure	Internally loaded, adjustable; 750 psig inlet, 50 psig outlet.	Wallace O. Leonard P/N 146050-28	10437835-1	
A2121	1	Regulator, Pressure	Dome-loaded; 3000 psig inlet, 50 psig outlet	Marotta P/N 226944-1	75M51102-1	
A2122	1	Valve, Relief	Relieves at 60 (± 3) psig; reseats at 54 psig min	Fluid Mechanics P/N 2-846	10430216-6	
A2123	1	Gage, Pressure	0 to 100 psig range; 50 psig normal indication	Marsh P/N 210-CSFMH	75M50147-4	
A2124	1	Valve, Shuttle	1/4 in; 3-way, 2-position	Clary Dynamics P/N 524255	10434448	
A2125	1	Switch, Pressure	Actuates at 35 (± 0.75) psig; deactuates at 2 psig below actuation pressure	Southwestern Indus.Inc. P/N PS5116-625	1043297-3	55A5A6
A2126 is not functionally applicable to this system.						

Finding Number	Reqd	Component	Remarks	Vendor	Drawing Number	Elec. Sym.
A2127	1	Valve, Manual	1/4 in.	Robbins P/N SSNA-250-4T-787	75M01305-1	
A2128	1	Valve, Check	1/4 in., cracking pressure 4 psig max	James, Pond & Clark P/N H249T1-4TT	10430234-1	
A2129 is not functionally applicable to this system.						
A2130	1	Valve, Manual	1/2 in.	Marotta P/N 223143-3	75M51064-3	
A2131	1	Valve, Manual	1/4 in.	Robbins P/N SSNA-250-4T-787	75M01305-1	
A2132	1	Valve, Check	1/4 in., cracking pressure 4 psig max	James, Pond & Clark P/N H299T1-4TT	10430233-1	
A2133 is not functionally applicable to this system.						
A2134	1	Valve, Check	1 in., cracking pressure 4 psig max	James, Pond & Clark P/N H299T1-16TT	10430233-5	
A2135	1	Valve, Solenoid	3-way, NC	Marotta (MV123) P/N 204423	10425701	55A5A3
A2136	1	Valve, Check	1/4 in., cracking pressure 4 psig max	James, Pond & Clark P/N H299T1-4TT	10430233-1	
A2137 is not functionally applicable to this system.						
A2138	1	Valve, Solenoid	3-way, NC	Marotta (MV123)	10425701	55A5A2

Finding Number	Reqd	Component	Remarks	Vendor	Drawing Number	Elec. Sym.
A2139	1	Valve, Manual	1/4 in.	Hoke	75M02711-2	
A2140	1	Valve, Check	1/4 in., cracking pressure 4 psig max	James, Pond & Clark P/N H299T1-4TT	10430233-1	
A2141 through A2156 are not functionally applicable to this system.						
A2157	1	Valve, Relief	Relieves at 70 (± 5) psig; reseats at 55 psig min	James, Pond & Clark P/N 5159T1-4TB-70	10430079-5	
A2158	1	Valve, Relief	Relieves at 70 (± 5) psig; reseats at 55 psig min	James, Pond & Clark P/N 5159T1-4TB-70	10430079-5	
A2159	1	Manifold, Vent	7 port		75M05677	
A2160 is not functionally applicable to this system.						
A2161	1	Gage, Pressure	0 to 1000 psig range; 750 psig normal indication	Marsh P/N 210-3SSFMH	75M50147-11	
A2162	1	Valve, Manual	1 in.	Marotta P/N 223774-1	75M51063-1	
A2163	1	Valve, Manual	3/8 in.	Robbins P/N SSNA-375A-6T-768	75M01305-2	
A2164	1	Valve, Check	3/8 in., cracking pressure 4 psig max	James, Pond & Clark P/N H299T1-6TT	10430233-2	
A2165	1	Valve, Check	1 in., cracking pressure 4 psig max	James, Pond & Clark P/N H299T1-16TT	10430233-5	

Finding Number	Reqd	Component	Remarks	Vendor	Drawing Number	Elec. Sym.
A2166 through A2299 are not functionally applicable to this system.						
A2300	1	Valve, Manual	1/2 in.	Douglas Aircraft Corp. P/N 3864055-1		
A2301 is not functionally applicable to this system.						
A2302	1	Filter	1/2 in., 10 micron nominal	DAC P/N 3864058-1		
A2303 is not functionally applicable to this system.						
A2304	1	Transducer, Pressure		DAC P/N 7861472-555		497PT20
A2305 is not functionally applicable to this system.						
A2306	1	Gage, Pressure	0 to 10,000 psig range; 6000 psig normal indication	DAC P/N S373274OV-12		
A2307 is not functionally applicable to this system.						
A2308	1	Snubber				
A2309 through A2311 are not functionally applicable to this system.						
A2312	1	Valve, Solenoid	NC	DAC P/N 3864060-1		497ES6

Finding Number	Reqd	Component	Remarks	Vendor	Drawing Number	Elec. Sym.
A2313 is not functionally applicable to this system.						
A2314	1	Valve, Solenoid	N. O.	DAC P/N 3864060-1		497ES5
A2315 is not functionally applicable to this system.						
A2316	1	Valve, Check	1/2 in.	DAC P/N 2864067-1		
A2317	1	Valve, Check	1/2 in.	DAC P/N 3864067-1		
A2318	1	Valve, Solenoid	N.O.	DAC P/N 3864061-1		497NS5
A2319	1	Snubber				
A2320	1	Valve, Solenoid	NC	DAC P/N 3864060-1		497NS4
A2321	1	Valve, Solenoid	NC	DAC P/N 3864062-501		497ES1
A2322	1	Orifice				
A2323 is not functionally applicable to this system.						
A2324	1	Valve, Manual	1/2 in.	DAC P/N 3864055-1		

Finding Number	Reqd	Component	Remarks	Vendor	Drawing Number	Elec. Sym.
A2325	1	Regulator, Pressure	Internally loaded, motor controlled; 6000 psig inlet, 3000 psig outlet	DAC P/N 5865918-1		497E8
A2326	1	Gage, Pressure	0 to 5000 psig range; 3000 psig normal indication	DAC P/N S3733274QU-12		
A2327	1	Snubber				
A2328	1	Transducer, Pressure		DAC P/N 5865846		497PT2Z
A2329 is not functionally applicable to this system.						
A2330	1	Regulator, Pressure	Dome-loaded; 6000 psig inlet, 3000 psig outlet	DAC P/N 3864065-1		
A2331	1	Valve, Relief	Relieves at 3500 (± 105) psig; reseats at 3000 psig min	DAC P/N 384068-507		
A2332 is not functionally applicable to this system.						
A2333	1	Transducer, Pressure		DAC P/N 5865846		497PT23
A2334	1	Snubber				
A2335	1	Gage, Pressure	0 to 5000 psig range; 3000 psig normal indication	DAC P/N S773274OU-12		
A2336	1	Valve, Manual	1/4 in.	DAC P/N 3864056-1		

Finding Number	Reqd	Component	Remarks	Vendor	Drawing Number	Elec. Sym.
A2337 through A2342 are not functionally applicable to this system.						
A2343	1	Valve, Manual	1/2 in.	DAC P/N 3864055-1		
A2344	1	Regulator, Pressure	Internally loaded, motor controlled; 6000 psig inlet 3000 psig outlet	DAC P/N 5865918-1		497E5
A2345	1	Gage, Pressure	0 to 5000 psig range; 3000 psig normal indication	DAC P/N S373274OU-12		
A2346	1	Snubber				
A2347	1	Transducer, Pressure		DAC P/N 5865846		497PT19
A2348 is not functionally applicable to this system.						
A2349	1	Regulator, Pressure	Dome-loaded 6000 psig inlet; 3000 psig outlet	DAC P/N 3864065-1		
A2350	1	Valve, Manual	1/2 in.	P/N 3864056-501		
A2351	1	Regulator, Pressure	Internally loaded, adjustable; 3000 psig inlet, 500 psig outlet	DAC P/N 3864064-501		
A2352	1	Gage, Pressure	0 to 1000 psig range; 500 psig normal indication	DAC P/N S3732740M12		
A2353	1	Snubber				

Finding Number	Reqd	Component	Remarks	Vendor	Drawing Number	Elec. Sym.
A2354 is not functionally applicable to this system.						
A2355	1	Regulator, Pressure	Dome-loaded; 3000 psig inlet, 500 psig outlet	DAC P/N 3864066-1		
A2356 is not functionally applicable to this system.						
A2357	1	Transducer, Pressure		DAC P/N 5865846		497PT17
A2358	1	Snubber				
A2359	1	Gage, Pressure	0 to 1000 psig range; 500 psig normal indication	DAC P/N S3732740M12		
A2360	1	Regulator, Pressure	Internally loaded, adjustable; 500 psig inlet, 50 psig outlet	DAC P/N 3864064-1		
A2361	1	Gage, Pressure	0 to 100 psig range; 50 psig normal reading	DAC P/N S3732740E12		
A2362	1	Snubber				
A2363 is not functionally applicable to this system.						
A2364	1	Regulator, Pressure	Dome-loaded; 500 psig inlet, 50 psig outlet	DAC P/N 3864066-1		
A2365 is not functionally applicable to this system.						

Finding Number	Reqd	Component	Remarks	Vendor	Drawing Number	Elec. Sym.
A2366	1	Transducer, Pressure		DAC P/N 5865846		497PT16
A2367	1	Snubber				
A2368	1	Gage, Pressure	0 to 100 psig range; 50 psig normal indication	DAC P/N S3732740E12		
A2369	1	Valve, Manual	1/4 in.	DAC P/N 3864056-1		
A2370	1	Valve, Relief	Relieves at 60 (± 1.8) psig; reseats at 50 psig min	DAC P/N 3864068-501		
A2371	1	Valve, Solenoid	NC	DAC P/N 3864062-1		497ES2
A2372	1	Orifice				
A2373 and A2374 are not functionally applicable to this system.						
A2375	1	Valve, Manual	1/4 in.	DAC P/N 3864056-1		
A2376	1	Filter	1/2 in., 10 micron nominal	DAC P/N 3865916-1		
A2377 is not functionally applicable to this system.						
A2378	1	Transducer, Pressure		DAC P/N 5865846		497PT18

Finding Number	Reqd	Component	Remarks	Vendor	Drawing Number	Elec. Sym.
A2379	1	Snubber				
A2380	1	Gage, Pressure	0 to 5000 psig range; 3000 psig normal indication	DAC P/N 3732740U12		
A2381	1	Valve, Relief	Relieves at 3500 (±105) psig; reseats at 3000 psig min	DAC P/N 3864068-507		
A2382	1	Valve, Manual	1/4 in.	DAC P/N 3864056-1		
A2383	1	Valve Solenoid	NC	DAC P/N 3864062-501		497ES4
A2384	1	Filter	1/2 -n., 10 micron nominal	DAC P/N 3865916-1		
A2385	1	Snubber				
A2386	1	Valve, Manual	1/2 in.	DAC P/N 3864056-501		
A2387 through A2518 are not functionally applicable to this system.						
A2519	1	Valve, Manual	1/2 in.	DAC P/N 3864055-1		
A2520	1	Filter	10 micron nominal	DAC P/N 3864058-1		
A2521	1	Transducer, Pressure		DAC P/N 7861472-539		498PT25

Finding Number	Reqd	Component	Remarks	Vendor	Drawing Number	Elec. Sym.
A2522	1	Gage, Pressure	0 to 10,000 psig range; 6000 psig normal indication	DAC P/N S3732740V12		
A2523	1	Snubber				
A2524 is not functionally applicable to this system.						
A2525	1	Valve, Manual	1/4 in.	DAC P/N 3864056-1		
A2526	1	Orifice				
A2527	1	Regulator, Pressure	Internally loaded, adjustable; 6000 psig inlet, 3000 psig outlet	DAC P/N 3864064-509		
A2528	1	Gage, Pressure	0 to 5000 psig range; 3000 psig normal indication	DAC P/N S3732740U12		
A2529	1	Regulator, Pressure	Dome-loaded; 6000 psig inlet, 3000 psig outlet	DAC P/N 3864065-1		
A2530	1	Snubber				
A2531 is not functionally applicable to this system.						
A2532	1	Gage, Pressure	0 to 5000 psig range; 3000 psig normal indication	DAC P/N S3732740U12		
A2533	1	Snubber				

Finding Number	Reqd	Component	Remarks	Vendor	Drawing Number	Elec. Sym.
A2534 is not functionally applicable to this system.						
A2535	1	Transducer, Pressure	1/4 in.	DAC P/N 7861472-547		498PT26
A2536	1	Regulator, Pressure	Internally loaded, adjustable; 3000 psig inlet, 750 psig outlet	DAC P/N 3864064-503		
A2537	1	Gage, Pressure	0 to 1000 psig range; 750 psig normal indication	DAC P/N S3732740M12		
A2538	1	Snubber				
A2539	1	Valve, Pneumatic	2-1/2 in., NC	DAC P/N 3864048-1		498EP2
A2540	1	Regulator, Pressure	Dome-loaded; 3000 psig inlet, 750 psig outlet	DAC P/N 3964066-1		
A2541 is not functionally applicable to this system.						
A2542	1	Snubber				
A2543	1	Gage, Pressure	0 to 1000 psig range; 750 psig normal indication	DAC P/N S3732740M12		
A2544	1	Transducer, Pressure		DAC P/N 7861472-529		498PT13
A2545	1	Valve, Relief	Relieves at 850 (± 25.5) psig; reseats at 750 psig min	DAC P/N 3864068-1		

Finding Number	Reqd	Component	Remarks	Vendor	Drawing Number	Elec. Sym.
A2546	1	Valve, Solenoid	1/2 in. NC	DAC P/N 3864062-501		498NS1
A2547	1	Filter	1/2 in., 10 micron nominal	DAC P/N 3865916-1		
A2548	1	Valve, Manual	1/4 in.	DAC P/N 3864056-1		
A2549	1	Valve, Manual	1/2 in.	DAC P/N 3864056-501		
A2550	1	Regulator, Pressure	Internally loaded, adjustable; 750 psig inlet, 50 psig outlet	DAC P/N 3864064-1		
A2551	1	Regulator, Pressure	Dome-loaded; 750 psig inlet, 50 psig outlet	DAC P/N 3864066-1		
A2552 is not functionally applicable to this system.						
A2553	1	Snubber				
A2554	1	Gage, Pressure	0 to 100 psig range; 50 psig normal indication	DAC P/N S3732740E12		
A2555	1	Transducer, Pressure		DAC P/N 7861742-509		498PT14
A2556	1	Gage, Pressure	0 to 100 psig range; 50 psig normal indication	DAC P/N S3732740E12		
A2557	1	Snubber				

Finding Number	Reqd	Component	Remarks	Vendor	Drawing Number	Elec. Sym.
A2558 is not functionally applicable to this system.						
A2559	1	Valve, Relief	Relieves at 60 (± 1.8) psig; reseats at 50 psig min	DAC P/N 3864068-501		
A2560	1	Valve, Manual	1/4 in.	DAC P/N 8864056-1		
A2561	1	Valve, Solenoid	1/2 in., NC	DAC P/N 3864062-501		498NS2
A2562	1	Filter	1/2 in., 10 micron nominal	DAC P/N 3865916-1		
A2563	1	Valve, Solenoid	1/4 in., NC	DAC P/N 3864062-1		498NS3
A2564 through A2572 are not functionally applicable to this system.						
A2573	1	Valve, Manual	1/2 in.	DAC P/N 3864056-501		
A2574	1	Filter	1-3/4 in., 10 micron nominal	DAC P/N 3865916-1		
A2575	1	Valve, Manual	1/4 in.	DAC P/N 3864056-1		
A2576	1	Valve, Pneumatic	4-1/4 in., NC	DAC P/N 3865919-1		498EP3
A2577	1	Valve, Solenoid	NC	DAC P/N 3863940-1		498NS8

Finding Number	Reqd	Component	Remarks	Vendor	Drawing Number	Elec. Sym.
A2578	1	Valve, Solenoid	NC	DAC P/N 3863940-1		498NS7
A2579 is not functionally applicable to this system.						
A2580	1	Valve, Check	1/2 in.	DAC P/N 3864057-1		
A2581	1	Orifice				
A2582	1	Orifice				
A2583	1	Valve, Pneumatic	2-1/2 in., NC	DAC P/N 3864048-1		498EP1
A2584	1	Valve, Solenoid	1/4 in.	DAC P/N 3863940-1		498NS6
A2585	1	Valve, Solenoid	1/4 in.	DAC P/N 3863940-1		498NS9
A2586	1	Valve, Pneumatic	4-1/4 in., NC	DAC P/N 385619-501		498EP6
A2587	1	Filter	1/2 in., 10 micron nominal	DAC P/N 3856916-1		
A2588	1	Snubber				
A2589 and A2590 are not functionally applicable to this system.						

Finding Number	Reqd	Component	Remarks	Vendor	Drawing Number	Elec. Sym.
A2591	1	Orifice		DAC P/N S2253887-8C-250		
A2592	1	Orifice		DAC P/N S2253887-8C-172		
A2593 through A3051 are not functionally applicable to this system.						
A3052	1	Orifice	0.200 in. dia.		75M04703	
A3053 through A3062 are not functionally applicable to this system.						
A3063	1	Coupling, Quick-Disconnect		E. B. Wiggins Oil Tool Co. Inc. P/N 6200R76A12	75M02218	
A3064 through A3155 are not functionally applicable to this system.						
A3156	1	Coupling, Quick-Disconnect		E. B. Wiggins Oil Tool Co. Inc. P/N 6200R78A4	75M02212	
A3157 through A3247 are not functionally applicable to this system.						
A3248	1	Coupling, Quick-Disconnect		E. B. Wiggins Oil Tool Co. Inc. P/N 6200R67A6	75M02216	
A3249 through A3949 are not functionally applicable to this system.						
A3950	1	Heat Exchanger, Helium Cooler		DAC P/N 7863909-501		

Finding Number	Reqd	Component	Remarks	Vendor	Drawing Number	Elec. Sym.
A3951	1	Sensor, Liquid Level	Low, high, and maximum level indication	DAC P/N 7864143-501		
A3952	1	Sensor, Temperature		DAC P/N 7861475-551		
A3953	1	Transducer, Pressure	0 to 1000 microns Hg vacuum range; 50 microns normal indication	Consolidation Vacuum Corp. P/N GTC-004		
A3954	1	Valve, Manual		VECCO R100P		
A3955 through A5000 are not functionally applicable to this system.						
A5001	1	Valve, Manual	1 in., shutoff	Marotta P/N 223774	75M51063	
A5002	1	Filter	5 micron, 98.6 percent nominal	Bendix P/N 041675	10434444-3	
A5003 is not functionally applicable to this system.						
A5004	1	Gage Pressure	0 to 5000 psig range; 3000 psig normal indication	U. S. Gauge P/N AW1827AK01	10437806-9	
A5005	1	Valve, Manual	3/8 in.	Robbins P/N NT-180	10437694	
A5006	1	Valve, Manual	1/4 in.	Robbins P/N SSNA-250-4T-787	75M01305-1	
A5007	1	Valve, Manual	3/8 in.	Robbins P/N NT-180	10437694	

Finding Number	Reqd	Component	Remarks	Vendor	Drawing Number	Elec. Sym.
A5008	1	Valve, Manual	3/8 in.	Robbins P/N NT-180	10437694	
A5009	1	Valve, Solenoid	NC	Marotta (MV130T) P/N 212783-1	10437739	57A9A5
A5010	1	Valve, Solenoid	NC	Marotta P/N 216774-1 (MV159CA)	10437737	57A9A14
A5011 and A5012 are not functionally applicable to this system.						
A5013	1	Outlet, Test				
A5014	1	Muffler	3/8 in.	C. W. Morris P/N AA-3	10434141-2	
A5015 through A5017 are not functionally applicable to this system.						
A5018	1	Regulator, Pressure	Dome-loaded;, 3000 psig inlet, 750 psig outlet	Grove P/N M12951J	75M02156-2	
A5019	1	Regulator, Pressure	Internally loaded; 3000 psig inlet, 750 psig outlet	W. O. Leonard P/N 187040-2	75M50182	
A5020	1	Valve, Relief	Relieves at 850(± 43) psig reseats at 770 psig min	James, Pond & Clark P/N 5159T1-6TT-850	75M02172-3	
A5021	1	Gage, Pressure	0 to 1000 psig range; 750 psig normal indication	U. S. Gauge P/N AW 1827AH01	10437804	
A5022	1	Valve, Manual	1/4 in.	Robbins P/N SSNA-25-4T-787	75M01305-1	

Finding Number	Reqd	Component	Remarks	Vendor	Drawing Number	Elec. Sym.
A5023	1	Valve, Solenoid	3-way, NC	Marotta (MV123) P/N 204424	10425701	57A9A6
A5024 through A5045 are not functionally applicable to this system.						
A5046	1	Valve, Manual	3/8 in.	Robbins P/N NT-180	10437694	
A5047	1	Gage, Pressure	0 to 5000 psig range; 3000 psig normal indication	U. S. Gauge P/N AW1827AK01	10437806-9	
A5048	1	Filter	0.80 (± 0.05) microns nominal	Millipore P/N XX4504700 (mod.)	75M50561-1	
A5049 is not functionally applicable to this system.						
A5050	1	Regulator, Pressure	Internally loaded; 3000 psig inlet, 450 psig outlet	W. O. Leonard P/N 128390-4	75M50726-2	
A5051 and A5052 are not functionally applicable to this system.						
A5053	1	Orifice	Reduces 450 psig to 150 psig at 1.5 scfm	W. O. Leonard P/N 156040-5	75M50727-2	
A5054 is not functionally applicable to this system.						
A5055	1	Switch, Pressure	DPDT dual bellows pressure switch; actuates at 45 (±5) psig and deactuates at 100 (±5) psig	Meletron P/N M7141EB-32A-2	75M50728-1	57A9A3
A5056	1	Orifice	Reduces 50 psig to 16 psig (approx) at 1.5 scfm	A. U. Stone P/N P881-8	75M04165-8	

Finding Number	Reqd	Component	Remarks	Vendor	Drawing Number	Elec. Sym.
A5057 is not functionally applicable to this system.						
A5058	1	Valve, Solenoid	3-way, N.O.	Marotta P/N 223194(MV1232B)	75M02986-1	57A9A10
A5059 and A5060 are not functionally applicable to this system.						
A5061		Orifice	Reduces 450 psig to 150 psig at 1.5 scfm	W. C. Leonard P/N 156040-5	75M50727-2	
A5062 is not functionally applicable to this system.						
A5063	1	Switch, Pressure	Actuates at 45 and 100 psig increasing pressure; deactuates at 25 psig below actuating pressure	Meletron P/N M7141EB-32A-2	75M50728-1	57A9A4
A5064	1	Orifice	Reduces 50 psig to 16 psig (approx) at 1.5 scfm	A. U. Stone P/N P881-8	75M04165-8	
A5065 is not functionally applicable to this system.						
A5066	1	Valve, Solenoid	3-way, N. O.	Marotta P/N 223194 (MV123B)	75M02986-1	57A9A11
A5067 through A5069 are not functionally applicable to this system.						
A5070	1	Valve, Solenoid	3-way, N. O.	Marotta (MV123B) P/N 223194	75M02986	57A9A9
A5071 and A5072 are not functionally applicable to this system.						

Finding Number	Reqd	Component	Remarks	Vendor	Drawing Number	Elec. Sym.
A5073	1	Valve, Relief	1/4 in., relieves at 600 psig	James, Pond & Clark P/N 5159T1-4TB-600	10430079-6	
A5074 through A5077 are not functionally applicable to this system.						
A5078	1	Orifice	0.031 (±0.001) in. dia.	A. U. Stone P/N H228-031	75M50562-1	
A5079	1	Plate, Bleed	1248 scim at 3 in. H_2O, calibrated	Del Mfg. Co. P/N 10023	75M02047	
A5080 through A5151 are not functionally applicable to this system.						
A5152	1	Filter	5-micron, 98.6 percent nominal	Bendix P/N 041675	10434444-3	
A5153	1	Filter	5-micron 98.6 percent nominal	Bendix P/N 041675	1034444-3	
A5154	1	Valve, Solenoid	NC	Marotta P/N MV159CA (Mod.)	10437737	55A6A24
A5155 is not functionally applicable to this system.						
A5156	1	Gage, Pressure	0 to 5000 psig range; 3000 psig normal indication	Marsh P/N 210-3SSFMH	75M50147-15	
A5157	1	Manifold, Distribution	3000 psig GN_2		10432680	
A5158	1	Valve, Solenoid	NC	Marotta P/N 212783-1 (MV-130T)	10437739	55A6A3

Finding Number	Reqd	Component	Remarks	Vendor	Drawing Number	Elec. Sym.
A5159	1	Valve, Manual	3/8 in.	Robbins P/N NT-180	10437694	
A5160	1	Valve, Manual	3/8 in.	Robbins P/N NT-180	10437694	
A5161	1	Valve, Check	3/8 in., cracking pressure 4 psig max	James, Pond & Clark P/N H299T1-6TT	10430233-2	
A5162	1	Valve, Manual	1/4 in.	Robbins P/N SSNG250-4T-768	75M01720-4	
A5163	1	Outlet, Test			MC200C4	
A5164 is not functionally applicable to this system.						
A5165	1	Valve, Manual	1/2 in.	Marotta P/N 223143-3	75M51064-3	
A5166	1	Regulator, Pressure	Internally loaded: 3000 psig inlet 750 psig outlet	Wallace O. Leonard P/N 187040-2	75M0182	
A5167	1	Regulator, Pressure	Dome-loaded; 3000 psig inlet 750 psig outlet	Grove Mod. 201B	75M01356-1	
A5168	1	Valve, Relief	Relieves at 875 (± 44) psig; reseats at 790 psig min	Fluid Mechanics P/N 2-847	10430216-3	
A5169 and A5170 are not functionally applicable to this system.						
A5171	1	Valve, Manual	3/8 in.	Robbins P/N NT-180	10437694	

Finding Number	Reqd	Component	Remarks	Vendor	Drawing Number	Elec. Sym.
A5172	1	Valve, Check	3/8 in., cracking pressure 4 psig max	James, Pond & Clark P/N HP299T1-6TT	10430233-2	
A5173	1	Valve, Shuttle	1/4 in.	Clary P/N 524255	10434448	
A5174	1	Switch, Pressure	Actuates at 625 (±15) psig; deactuates at 40 psig max below actuation pressure	Southwestern Indus. Inc. P/N PS5116-625	10434443-6	55A6A4
A5175 is not functionally applicable to this system.						
A5176	1	Gage, Pressure	0 to 1000 psig range; 750 psig normal indication	Marsh P/N 210-3SSFMH	75M0147-11	
A5177	1	Valve, Manual	3/4 in.	Marotta P/N 223143-2	75M51064-2	
A5178	1	Valve, Manual	3/8 in.	Robbins P/N NT-180	10437694	
A5179	1	Valve, Check	3/8 in., cracking pressure 4 psig max	James, Pond &Clark P/N HP299T1-6TT	10430233-2	
A5180	1	Valve, Shuttle	1/4 in.	Clary P/N 524255	10434448	
A5181	1	Switch, Pressure	Actuates at 625 (±15) psig; deactuates at 40 psig max. below actuating pressure	Southwestern Indus. Inc. P/N PS5116-625	1043443-6	55A6A16
A5182 is not functionally applicable to this system.						
A5183	1	Gage, Pressure	0 to 1000 psig range; 750 psig normal indication	Marsh P/N 210-3SSFMH	75M50147-11	

Finding Number	Reqd	Component	Remarks	Vendor	Drawing Number	Elec. Sym.
A5184 is not functionally applicable to this system.						
A5185	1	Regulator, Pressure	Internally loaded; 3000 psig inlet; 290 psig outlet	Wallace O. Leonard P/N 187040-2	75M50182	
A5186	1	Regulator, Pressure	Dome loaded; 3000 psig inlet; 290 psig outlet	Grove P/N M129551J	75M02156-2	
A5187	1	Valve, Manual	3/8 in.	Robbins P/N NT-180	10437694	
A5188	1	Valve, Check	3/8 in., cracking pressure 4 psig max	James, Pond & Clark P/N A99T1- 6TB	75M50149-2	
A5189	1	Valve, Relief	Relieves at 380 (±20) psig; reseats at 300 psig min.	James, Pond & Clark P/N 5159T1-6TT-380	75M02172-1	
A5190	1	Valve, Shuttle	1/4 in., 3-way, 2-position	Clary P/N 524255	10434448	
A5191	1	Switch, Pressure	Actuates at 185 (±15) psig, deactuates at 30 psig max. below actuating pressure	Southwestern Indus. Inc. P/N PS5116-425	10434443-12	55A6A15
A5192 is not functionally applicable to this system.						
A5193	1	Gage, Pressure	0 to 600 psig range; 290 psig normal indication	Marsh P/N 210-CSFMH	75M50147-9	
A5194	1	Valve, Solenoid	NC	Marotta P/N 212783-1	10437739	55A614
A5195 is not functionally applicable to this system.						

Finding Number	Reqd	Component	Remarks	Vendor	Drawing Number	Elec. Sym.
A5196	1	Regulator, Pressure	Internally loaded; 3000 psig inlet; 490 psig outlet	Rocketdyne P/N 5536445	10437906-9	
A5197	1	Orifice	0.031 (+0.002, -0.001) in. dia.	Rocketdyne P/N 9504-54062	10430000	
A5198	1	Valve, Solenoid	NC	Marotta (MV-74) P/N 202873-113	75M01351	55A6A5
A5199	1	Regulator, Pressure	Dome-loaded; 3000 psig inlet, 490 psig outlet	Grove P/N 109777A085B	75M50341-2	
A5200	1	Valve, Relief	Relieves at 700 (±35) psig; reseats at 565 psig min.	Fluid Mechanics P/N 2-922	10430216-11	
A5201 is not functionally applicable to this system.						
A5202	1	Valve, Shuttle	1/4 in.; 3-way 2-position	Clary P/N 534255	10434448	
A5203	1	Switch, Pressure	Actuates at 425 (±15) psig; max. diff press. 35 psig	Southwestern Indus. Inc P/N PS3704-21.5	10434443-4	55A6A6
A5204 is not functionally applicable to this system.						
A5205	1	Gage, Pressure	0 to 1000 psig range; 490 psig normal indication	Marsh P/N 210-3SSFMH	75M50147-11	
A5206 and A5207 are not functionally applicable to this system.						
A5208	1	Regulator, Pressure	Internally-loaded, adjustable; 3000 psig inlet, 300 psig outlet	Rocketdyne P/N 553645	10437906-7	

Finding Number	Reqd	Component	Remarks	Vendor	Drawing Number	Elec. Sym.
A5209	1	Orifice	0.031 (+0.002, -0.001) in. dia.	Rocketdyne P/N 9504-45062	10430000	
A5210	1	Valve, Solenoid	3-way, 2-position, NC	Marotta P/N 202973-113 (MV74)	75M01351	55A6A9
A5211	1	Regulator, Pressure	Dome loaded; 3000 psig inlet; 300 psig outlet	Grove P/N 10977A085B	75M50341-1	
A5212	1	Valve, Relief	Relieves at 530 (± 30) psig; reseats at 430 psig min.	Fluid Mechanics P/N 2-924	10430216-12	
A5213 is not functionally applicable to this system.						
A5214	1	Valve, Shuttle	1/4 in.; 3-way, 2-position	Clary P/N 524255	10434448	
A5215	1	Switch, Pressure	Actuates at 310 (± 15) psig; max. diff press. 35 psig	Southwestern Indus. Inc. P/N PS5116-625	10434443-13	55A6A10
A5216 is not functionally applicable to this system.						
A5217	1	Gage, Pressure	0 to 800 psig range; 300 psig normal indication	Marsh P/N 210-3SSFMH	75M50147-10	
A5218 and A5219 are not functionally applicable to this system.						
A5220	1	Regulator, Pressure	Internally loaded; 3000 psig inlet; 240 psig outlet	Rocketdyne P/N 553645	10437906-8	
A5221	1	Orifice	0.031(+0.002, -0.001) in. dia.	Rocketdyne P/N 9504-45062	10430000	

Finding Number	Reqd	Component	Remarks	Vendor	Drawing Number	Elec. Sym.
A5222	1	Valve, Solenoid	3-way, 2-position, NC	Marotta P/N 202873-113 (MV74)	75M01351	55A6A11
A5223	1	Regulator, Pressure	Dome loaded; 3000 psig inlet; 240 psig outlet	Grove P/N 10977A085B	75M0341-1	
A5224	1	Valve, Relief	Relieves at 315 (± 20) psig; reseats at 250 psig min	Fluid Mechanics P/N 2-921	10430216-13	
A5225 is not functionally applicable to this system.						
A5226	1	Valve, Shuttle	1/4 in., 3-way, 2-position	Clary P/N 524255	10434448	
A5227	1	Switch, Pressure	Actuates at 195 (± 15) psig; reseats at 30 psig max. below actuation press.	Southwestern Indus. Inc. P/N PS5116-195	10434443-14	55A6A12
A5528 is not functionally applicable to this system.						
A5229	1	Gage, Pressure	0 to 600 psig range; 240 psig normal reading	Marsh P/N 210-CSFMH	75M50147-9	
A5230 and A5231 are not functionally applicable to this system.						
A5232	1	Regulator, Pressure	Dome loaded; 3000 psig inlet; 240 psig normal indication	Grove P/N M12951J	75M02156-2	
A5233	1	Gage, Pressure	0 to 600 psig range; 240 psig normal indication	Marsh P/N 210-CSFMH	75M50147-9	
A5234	1	Valve, Solenoid	3/8 in., NC LOX dome purge control valve	Marotta (MV130T) P/N 212783-1	10437739	55A6A13

Finding Number	Reqd	Component	Remarks	Vendor	Drawing Number	Elec. Sym.
A5235 and A5236 are not functionally applicable to this system.						
A5237	1	Filter	5 micron, 98.6 percent nominal	Bendix P/N 041675	10434444-3	
A5238	1	Filter	5 micron, 98.6 percent nominal	Bendix P/N 041675	10434444-3	
A5239 and A5240 are not functionally applicable to this system.						
A5241	1	Gage, Pressure	0 to 5000 psig range; 3000 psig normal indication	Marsh P/N 210-3SSFMH	75M50147-15	
A5242	1	Valve, Manual	1 in., NC	Marotta P/N SPV-29	75M51063-1	
A5243 is not functionally applicable to this system.						
A5244	1	Regulator, Pressure	Internally loaded; 3000 psig inlet; 315 psig outlet	Wallace O. Leonard P/N 187040-2	75M50182	
A5245	1	Regulator, Pressure	Dome loaded; 3000 psig inlet; 315 psig outlet	Grove P/N 109888A066B	75M01356-1	
A5246	1	Valve, Relief	Relieves at 410 (± 25) psig; reseats at 330 psig min.	Fluid Mechanics P/N 2-925	1043216-14	
A5247	1	Valve, Manual	3/8 in.	Robbins P/N NT-180	10436794	
A5248	1	Valve, Check	3/8 in., cracking pressure 4 psig max	James, Pond & Clark P/N P299T1-6TB	75M50149-2	

Finding Number	Reqd	Component	Remarks	Vendor	Drawing Number	Elec. Sym.
A5249	1	Valve, Shuttle	1/4 in.; 3-way, 2-position	Clary P/N 524255	10434448	
A5250	1	Switch, Pressure	Actuates at 185 (±15) psig; Deactuates 30 psig below actuating pressure	Southwestern Indus. Inc. P/N PS5116-185	10434443-12	55A6A20
A5251 is not functionally applicable to this system.						
A5252	1	Gage, Pressure	0 to 800 psig range; 315 psig normal indication	Marsh P/N 210-3SSFMH	75M50147-10	
A5253 is not functionally applicable to this system.						
A5254	1	Valve, Manual$	1/2 in.	Marotta P/N SPV-27	75M51064-3	
A5255	1	Manifold, Vent	2 in.	Grayloc Tool Company	75M02102	
A5256 through A5266 are not functionally applicable to this system.						
A5267	1	Valve, Manual	3/8 in.	Robbins P/N NT-180	10437694	
A5268	1	Valve, Manual	1/2 in.	Marotta P/N 223143-3	75M51064-3	
A5269	1	Valve, Manual	3/8 in.	Robbins P/N NT-180	10437694	
A5270	1	Regulator, Pressure	Dome loaded; 3000 psig inlet; 750 psig outlet	Grove P/N M12951J	75M02156-2	

Finding Number	Reqd	Component	Remarks	Vendor	Drawing Number	Elec. Sym.
A5271	1	Regulator, Pressure	Internally loaded; 3000 psig inlet; 750 psig outlet	Wallace O. Leonard P/N 187040-2	75M50182	
A5272	1	Valve, Manaul	3/8 in.	Robbins P/N NT-180	10437694	
A5273	1	Valve, Relief	Relieves at 850 (± 25) psig; reseats at 770 psig min	James, Pond & Clark P/N 5159T1-6TT-850	75M02172-3	
A5274	1	Valve, Shuttle	1/4 in.	Clary P/N 525255	10434448	
A5275	1	Switch, Pressure	Actuates at 625 (± 15) psig; max. diff. press. 35 psig.	Southwestern Indus. Inc. P/N PS5116-625	1043443-6	55A6A8
A5276 is not functionally applicable to this system.						
A5277	1	Gage, Pressure	0 to 1500 psig range; 750 psig normal indication	Marsh P/N 210-3SSFMH	75M50147-12	
A5278 and A5279 are not functionally applicable to this system.						
A5280	1	Regulator, Pressure	1/4 in., 3000 psig inlet; 420 (± 20) psig output	W. O. Leonard P/N 128390-4	75M50726-2	
A5281	1	Gage Pressure	0 - 800 psig range	Marsh Co. P/N 0-800, 210-3SSFMH	75M50147-10	
A5282 through A5286 are not functionally applicable to this system.						
A5287	1	Valve, Manual	1/4 in.	Cardiar P/N 3510-0083	75M51076-1	

Finding Number	Reqd	Component	Remarks	Vendor	Drawing Number	Elec. Sym.
A5288	1	Valve, Manual	1/4 in.	Robbins P/N SS NA-250-4T-87	75M01305-1	
A5289	1	Valve, Manual	1/4 in.	Robbins P/N SS NA-250-4T-87	75M01305-1	
A5290	1	Valve, Manual	1/4 in.	Robbins P/N SS NA-250-4T-87	75M01305-1	
A5291	1	Switch, Pressure	Actuates at 15 (± 5) psig, deactuates at 5 psig	Custom Component P/N 8G46	10430405	55A6A23
A5292	1	Valve, Manual	1/2 in.	Marotta P/N SPV-27	75M50164-3	
A5293	1	Valve, Check	1/4 in., cracking pressure 4 psig max	James, Pond & Clark P/N 299T1-4TB	75M50149-1	
A5294	1	Valve, Check	1/4 in., cracking pressure 4 psig max	James, Pond & Clark P/N H299T1-4TT	10430233-1	
A5295 is not functionally applicable to this system.						
A5296	1	Valve, Relief	1/4 in.; relieves at 600 (± 30) psig, reseats at 535 psig min	James, Pond & Clark P/N 5159T1-4TB-600	10430079-6	
A5297 through A5402 are not functionally applicable to this system.						
A5403	1	Valve, Shuttle	1/4 in.; 3-way, 2-position	Clary Dynamics P/N 524200-3	10434448	
A5404 and A5405 are not functionally applicable to this system.						

Finding Number	Reqd	Component	Remarks	Vendor	Drawing Number	Elec. Sym.
A5406	1	Valve, Check	1/4 in., cracking pressure 4 psig max	James, Pond & Clark P/N H299T1-4TT	10430233-1	
A5407	1	Valve, Check	1/4 in., cracking pressure 4 psig max	James, Pond & Clark P/N H299T1-4TT	10430233-1	
A5408 through A5599 are not functionally applicable to this system.						
A5600	1	Valve, Solenoid	3/8 in., NC	Marotta (MV123) P/N 212783-1	10437739	53A60
A5601	1	Valve, Solenoid	3/8 in., NC	Marotta (MV123) P/N 204424	10425701	53A61
A5602	1	Valve, Solenoid	3/8 in., NC	Marotta (MV123) P/N 204424	10425701	53A62
A5603	1	Valve, Solenoid	3/8 in., NC	Marotta (MV123) P/N 204424	10425701	53A63
A5604	1	Valve, Solenoid	3/8 in., NC	Marotta (MV123) P/N 204424	10425701	53A64
A5605	1	Valve, Solenoid	3/8 in., NC	Marotta (MV123) P/N 204424	10425701	53A65
A5606	1	Valve, Solenoid	3/8 in., NC	Marotta (MV123) P/N 204424	10425701	53A66
A5607	1	Valve, Solenoid	3/8 in., NC	Marotta (MV123) P/N 204424	10425701	53A32A1A3
A5608 through A5615 are not functionally applicable to this system.						

Finding Number	Reqd	Component	Remarks	Vendor	Drawing Number	Elec. Sym.
A5616	1	Valve, Solenoid	3/8 in., NC	Marotta (MV123) P/N 204424	10425701	53A26
A5617	1	Valve, Solenoid	3/8 in., NC	Marotta (MV123) P/N 204424	10425701	53A27
A5618	1	Valve, Solenoid	3/8 in., NC	Marotta (MV123) P/N 204424	10425701	53A71
A5619	1	Orifice	0.030 in. dia.	A. U. Stone & Co. P/N H93C-030	10426725	
A5620	1	Orifice	0.030 in. dia.	A. U. Stone & Co. P/N H93C-030	10426725	
A5621 is not functionally applicable to this system.						
A5622	1	Muffler		C. W. Morris P/N AA-8	10434141-3	
A5623	1	Muffler		C. W. Morris P/N AA-8	10434141-3	
A5624	1	Muffler		C. W. Morris P/N AA-8	10434141-3	
A5625 through A6027 are not functionally applicable to this system.						
A6028	1	Valve, Solenoid		Marotta (MV173B) P/N 218914	75M02802	
A6029	1	Valve, Solenoid		Marotta (MV173B) P/N 218914	75M02802	

Finding Number	Reqd	Component	Remarks	Vendor	Drawing Number	Elec. Sym.
A6030	1	Valve, Solenoid	3-way, 2-position, NC	Marotta (MV123) P/N 204424	10425701	
A6031	1	Switch, Pressure	Actuates at 50 psig rising; deactuates at 100 psig rising	Meltron P/N M7141EB032A-a	75M50728-1	
A6032 through A6057 are not functionally applicable to this system.						
A6058	1	Valve, Manual		Futurecraft P/N 30416S	75M50161-9	
A6059	1	Valve, Check		James, Pond, & Clark P/N H249T1-16TT	10430234-5	
A6060 through A6067 are not functionally applicable to this system.						
A6068	1	Orifice		A. U. Stone P/N H264C-114	75M50184-2	
A6069	1	Orifice		A. U. Stone P/N H264C-310	75M50184-3	
A6070	1	Orifice		W. O. Leonard P/N 15604005	75M50727-2	
A6071	1	Orifice		A. U. Stone P/N P881-8	75M04165-8	
A6072 through A6081 are not functionally applicable to this system.						
A6082	1	Orifice	0.031 in. dia., purge inlet	A. U. Stone Co. P/N H228-031	75M50562-1	

Finding Number	Reqd	Component	Remarks	Vendor	Drawing Number	Elec. Sym.
A6083 is not functionally applicable to this system.						
A6084	1	Valve, Pneumatic	NC	Rocketdyne P/N 401359		
A6085	1	Valve, Solenoid	3-way, 2-position, N.O.	Marotta P/N 202973-113	75M01351	53A10A1
A6086	1	Valve, Solenoid	3-way, 2-position, NC	Marotta P/N 202873-113	75M01351	53A10A2
A6087	1	Plate Calibrated Bleed		DEL Mfg. P/N 10023	75M02047	
A6088	1	Valve, Check	Cracking pressure 3 psig	James, Pond & Clark P/N P-4-698-3	75M00178	
A6089	1	Valve, Check	Cracking pressure 3 psig	James, Pond & Clark P/N P-4-698-3	75M00178	
A6090 through A6501 are not functionally applicable to this system.						
A6502	1	Coupling, Quick-Disconnect	240 psig GN_2	E. B. Wiggins Oil Tool Co., Inc. P/N 6400R107A16	75M02214	
A6503	1	Coupling, Quick-Disconnect	550 psig GN_2	E. B. Wiggins Oil Tool Co., Inc. P/N 6400R106A20	75M02211	
A6504	1	Coupling, Quick-Disconnect	240 psig GN_2	E. B. Wiggins Oil Tool Co. Inc. P/N 6400R107A16	75M02214	
A6505 through A6602 are not functionally applicable to this system.						

Finding Number	Reqd	Component	Remarks	Vendor	Drawing Number	Elec. Sym.
A6603	1	Coupling, Quick-Disconnect	3000 psig GN_2	E. B. Wiggins Co. P/N 6400R109A6	75M02209	
A6604 through A6607 are not functionally applicable to this system.						
A6608	1	Coupling, Quick-Disconnect	450 psig GN_2	E. B. Wiggins Oil Tool Co. Inc. P/N 6400R17A16	75M02214	
A6609 through A6627 are not functionally applicable to this system.						
A6628	1	Orifice	0.063 in. dia.		75M05177	
A6629 through B197 are not functionally applicable to this system.						
B198	1	Sphere, Storage	3.0 cu. ft; 3000 psig GN_2		20M00937	
B199	1	Sphere, Storage	3.0 cu. ft; 3000 psig GN_2		20M00935	
B200	1	Coupling, Quick-Disconnect	3/8 in.	E. B. Wiggins Oil Tool Co., P/N 6005R67A6	20M30140	
B201	1	Filter	3/8 in., 25-micron	Walter Kidde & Co. P/N 84073	20M30127	
B202	1	Valve, Check	3/8 in.	James, Pond & Clark P/N P279T-6BB(L)	20M30124	
B203	1	Switch, Pressure	Actuates at 2835 (± 100) psig, deactuates at 2600 psig	Southwestern Indus. Inc. P/N PS13800-2800	20M30130	9A52

Finding Number	Reqd	Component	Remarks	Vendor	Drawing Number	Elec. Sym.
B204	1	Valve, Manual	1/4 in.; 3-way needle valve	Benton Corp. P/N B-17500	10414076	
B205	1	Sphere, Storage	1.0 cu ft; 3000 psig GN_2	Bendix Aviation Corp. P/N 19E-23-29UD	20M00837	
B206	1	Sphere, Storage	1.5 cu ft; 3000 psig GN_2	Bendix Aviation Corp. P/N 19E-23-12UD	20M00837	
B207	1	Valve, Solenoid	5-way, 2-position, NC	Marotta Valve Corp. P/N 213854	20M30131	9A51
B208	1	Filter	3/8 in., 25-micron	Walter Kidde & Co. P/N 840473	20M30127	
B209	1	Regulator, Pressure	Internally-loaded, adjustable; 3000 psig inlet, 750 psig outlet	Rocketdyne P/N 550278	20M30134	
B210	1	Valve, Relief	Relieves at 950 (± 50) psig; reseats at 845 psig	Rocketdyne P/N 550435	20M30137	
B211	1	Manifold	750 psig GN_2		20M00878	
B212	1	Valve, Manual	1/4 in., 3-way needle valve	Benton Corp. P/N B-17500	10414076	
B213	1	Switch, Pressure	Actuates at 625 (± 25) psig deactuates at 575 psig	Southwestern Indus. Inc. P/N PS-5100A	20M30135	9A53
B214 through B218 are not functionally applicable to this system.						
B219	1	Orifice	0.018 (+0.002 - 0.000) in. dia		20M00982	

Finding Number	Reqd	Component	Remarks	Vendor	Drawing Number	Elec. Sym.
B220	1	Valve Solenoid	3-way, 2-position, NC	Marotta P/N 20593-12	20M30160	9A9
B221	1	Calorimeter			50M12199	4A488
B222 through B230 are not functionally applicable to this system.						
B231	1	Valve, Check	3/4 in.	Marotta (CMV12) P/N 204022	20M30132	
B232	2	Sphere, Storage	3 cu. ft; 3000 psig GN_2	Bendix Aviation Corp. P/N 19E-23-22VD	20M00936	
B233	1	Valve, Solenoid	NC, with position indicators	Marotta P/N 225317-1	20M30171	11A68
B234	1	Valve, Solenoid	NC, with position indicators	Marotta P/N 225317-1	20M30171	11A69
B235	1	Manifold			20M00906	
B236	1	Valve, Solenoid	NC, with position indicators	Marotta P/N 225317-1	20M30171	11A70
B237	1	Valve, Solenoid	NC, with position indicators	Marotta P/N 225317-1	20M30171	11A71
B238	1	Valve, Solenoid	NC, with position indicators	Marotta P/N 225317-1	20M30171	11A72
B239	1	Valve, Solenoid	NC, with position indicators	Marotta P/N 225317-1	20M30171	11A73

Finding Number	Reqd	Component	Remarks	Vendor	Drawing Number	Elec. Sym.
B240	1	Valve, Solenoid	NC, with position indicators	Marotta P/N 225317-1	20M30171	11A74
B241	1	Valve, Solenoid	NC, with position indicators	Marotta P/N 225317-1	20M30171	11A79
B242	1	Valve, Solenoid	NC, with position indicators	Marotta P/N 225317-1	20M30171	11A80
B243	1	Sphere, Plenum	1.0 cu. ft.		20M00905	
B244 through B246 are not functionally applicable to this system.						
B247	6	Manifold, Dispersal			20M00909	
B248 and B249 are not functionally applicable to this system.						
B250	1	Coupling, Quick-Disconnect	3/4 in.	E. B. Wiggins Oil Tool Co. P/N 605A104A12	20M30133	
B251	1	Filter	3/4 in.	Permanent Filter Corp. P/N 20030	20M30129	
B252	1	Valve, Check	3/4 in.	Marotta Valve Corp. P/N 204022 (CMV12)	20M30132	
B253	2	Sphere, Storage	20 cu. ft; 3000 psig GN_2		20M00414	
B254 through B256 are not functionally applicable to this system.						

Finding Number	Reqd	Component	Remarks	Vendor	Drawing Number	Elec. Sym.
B257	1	Valve, Manual	1/4 in., 3-way needle		10414076	
B258	1	Switch, Pressure	Actuates 2835 (± 100) psig, deactuates at 2600 psig		20M30130	11A51
B259 through B421 are not functionally applicable to this system.						
B422	1	Sphere, Storage	3 cu. ft. triplex sphere assembly; 3000 psig He		10438020	
B423 through E199 are not functionally applicable to this system.						
E200	1	Coupling, Quick-Disconnect	3000 psig	Douglas Aircraft Corp. P/N 7851823-503		
E201	1	Valve, Check		DAC P/N 7851822-1		
E202	1	Sphere, Storage	3.5 cu. ft.; 3000 psig He	DAC P/N 7851820-1		
E203	1	Valve, Solenoid	NC	DAC P/N 7851825-1		407W12L3
E204	1	Valve, Relief	Relieves at 3250 (± 150) psig; reseats at 3100 psig approx	DAC P/N 7851824-501		
E205	1	Filter	10 micron	DAC P/N 7851840-1		
E206	1	Regulator, Pressure	3000 (± 100) psig inlet; 455 (± 25) psig outlet	DAC P/N 7851821-501		

Finding Number	Reqd	Component	Remarks	Vendor	Drawing Number	Elec. Sym.
E207	1	Valve, Solenoid	N. O.	DAC P/N 7851825-501		407W12L4
E208-1	1	Switch, Pressure	Actuates at 550 (± 8) psia; deactuates at 510 (± 10) psia	DAC P/N 7851830-1		407W12S1
E208-2	1	Switch, Pressure	Actuates at 550 (± 8) psia; deactuates at 510 (± 10) psia;	DAC P/N 7851830-1		407W12S13
E209 through E216 are not functionally applicable to this system.						
E217	1	Valve, Check		DAC P/N 7851822-1		
E218	1	Sphere, Storage	1.5 cu. ft., 3000 psig He; LH_2 container make-up pressurization	DAC P/N 5693830		
E219	1	Switch, Pressure	Actuates at 2940 (± 25) psig; deactuates at 2840 (± 25) psig	DAC P/N 7851830-503		
E220	1	Switch, Pressure	Actuates at 445 (± 5) psia; deactuates at 435 (± 5) psia	DAC P/N 7851830-501		
E221 through E261 are not functionally applicable to this system.						
E262	1	Valve, Check		DAC P/N 7851843-1		
E263	1	Orifice	0.037 in. dia	Del Mfg. Co. P/N R4-8		
E264	1	Valve, Solenoid	N. O.	DAC P/N 1A22472-1		407W12L12

Finding Number	Reqd	Component	Remarks	Vendor	Drawing Number	Elec. Sym.
E265 is not functionally applicable to this system.						
E266	1	Coupling, Quick-Disconnect	3000 psig	DAC P/N 1A22470-1		
E267	1	Orifice	0.059 in. dia	DAC P/N S0268-C8-059		
E268 through E270 are not functionally applicable to this system.						
E271	1	Sphere, Plenum	424 cu in.	DAC P/N 1A58515-1		
E272	1	Coupling, Quick-Disconnect	3000 psig	DAC P/N 1A22469-1		
E273 through E281 are not functionally applicable to this system.						
E282	1	Valve, Check		DAC P/N 7851822-1		
E283 through E314 are not functionally applicable to this system.						
E315	1	Switch, Pressure	Actuates at 2940 (± 25) psig; de-actuates at 2840 (± 25) psig	DAC P/N 7851830-503		407W12S10
E316 through G499 are not functionally applicable to this system.						
G500	1	Coupling, Quick-Disconnect	3/8 in.	E. B. Wiggins Oil Tool Co., P/N 6005R67A6	20M30140	

Finding Number	Reqd	Component	Remarks	Vendor	Drawing Number	Elec. Sym.
G501	1	Filter	3/8 in.; 20 micron	Walter Kidde & Co. P/N 84073	20M30414	
G502	1	Valve, Check	3/8 in.	James, Pond & Co. P/N P279T-6BB(L)	20M30124	
G503	1	Sphere, Storage	1 cu ft; 3000 psig GN_2		20M00976	
G504	1	Valve, Manual	1/4 in., 3-way	Benton Corp. P/N B-17500	20M30436-1	
G505	1	Switch, Pressure	Actuates at 2835 (± 100) psig; deactuates at 2600 psig min.	Southwestern Indus.Inc. P/N PS 3800-2800	20M30130	801A10
G506	1	Switch, Pressure	Actuates at 1375 (± 33) psig; deactuates at 70 psi above actuation pressure	Southwestern Indus. Inc. P/N PS-3800-D1375	20M30159	80A12
G507	1	Assembly, Regulator Valve	3000 psig inlet; 30 psig outlet	Wallace O. Leonard 200400-2	20M00817	802A39
G508	2	Filter	3/8 in.; 20 micron	Cosmic-Fairchild P/N 30474	20M30414	
G509	1	Thermostat			10414709	802A40
G510	2	Manifold	35 psig operating pressure		20M01023-1	
G511	1	Platform, Stabilized	ST-124		50M22001	
BA	1	Sphere, Storage	1.0 cu ft. 3000 psig; item A dwg 60C10986		20C21049-1	

Finding Number	Reqd	Component	Remarks	Vendor	Drawing Number	Elec. Sym.
BA-1	1	Nozzle Assembly	Item A-1 dwg 60C10986		60C10985-1	
BB	1	Valve, Check	Item B dwg 60C10986		20C30125	
BF	1	Valve, Solenoid	Item F dwg 60C10986		20C30380	

SECTION 3

MECHANICAL SCHEMATICS

This section contains mechanical schematics that show the functional arrangement of pneumatic distribution system components listed in section 2.

For a definition of the mechanical symbols used, see MSFC-STD-162A.

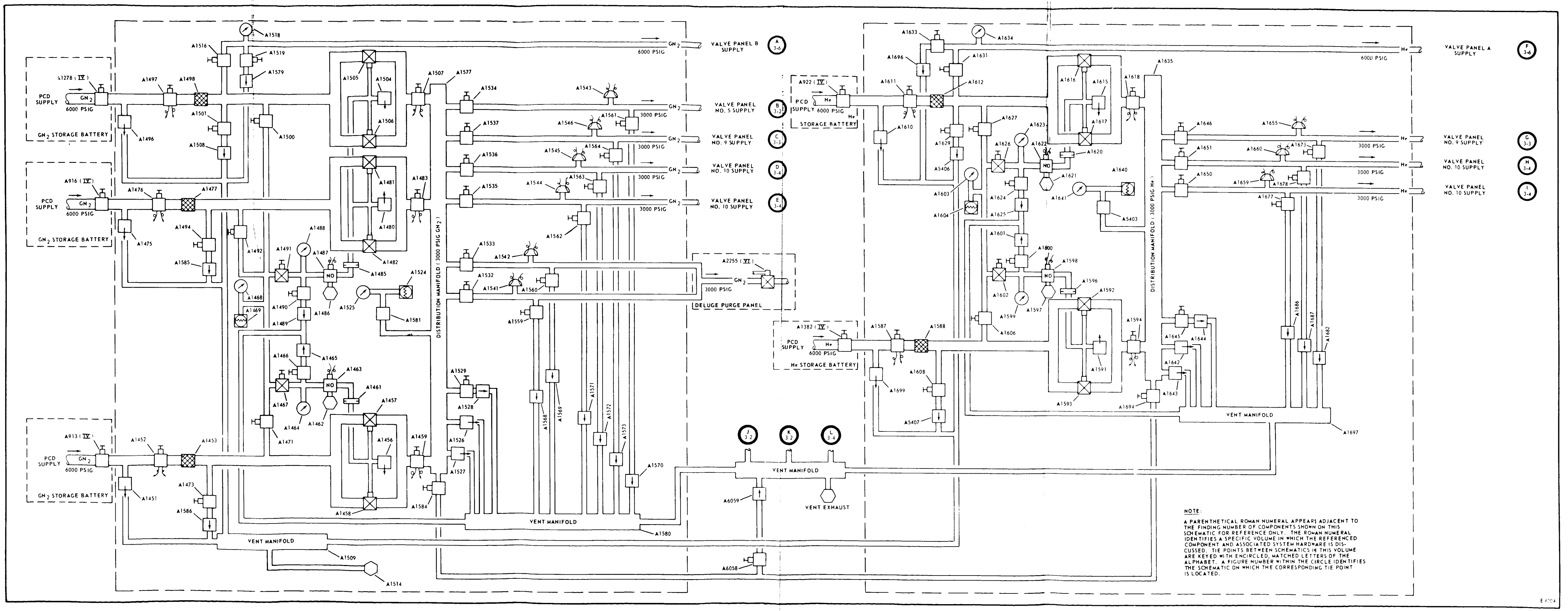

Figure 3-1. Pneumatic Control Distributor - Mechanical Schematic

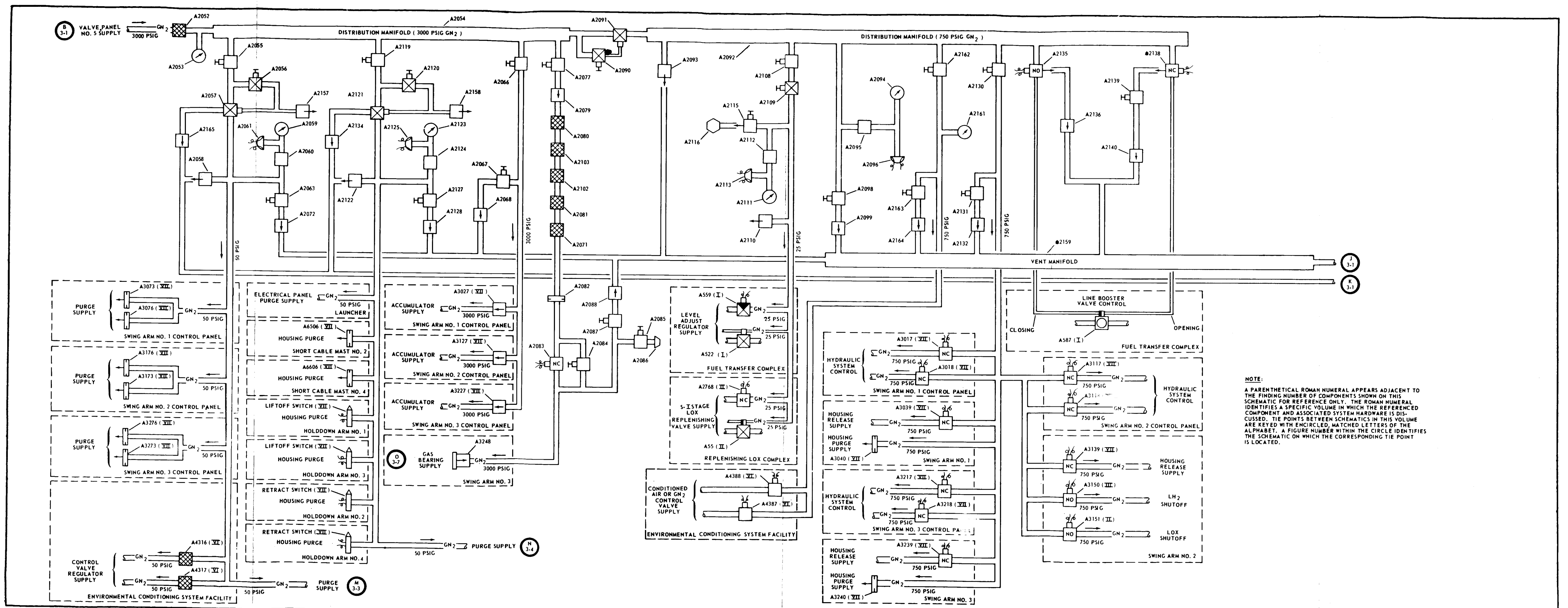

Figure 3-2. Valve Panel No. 5 - Mechanical Schematic

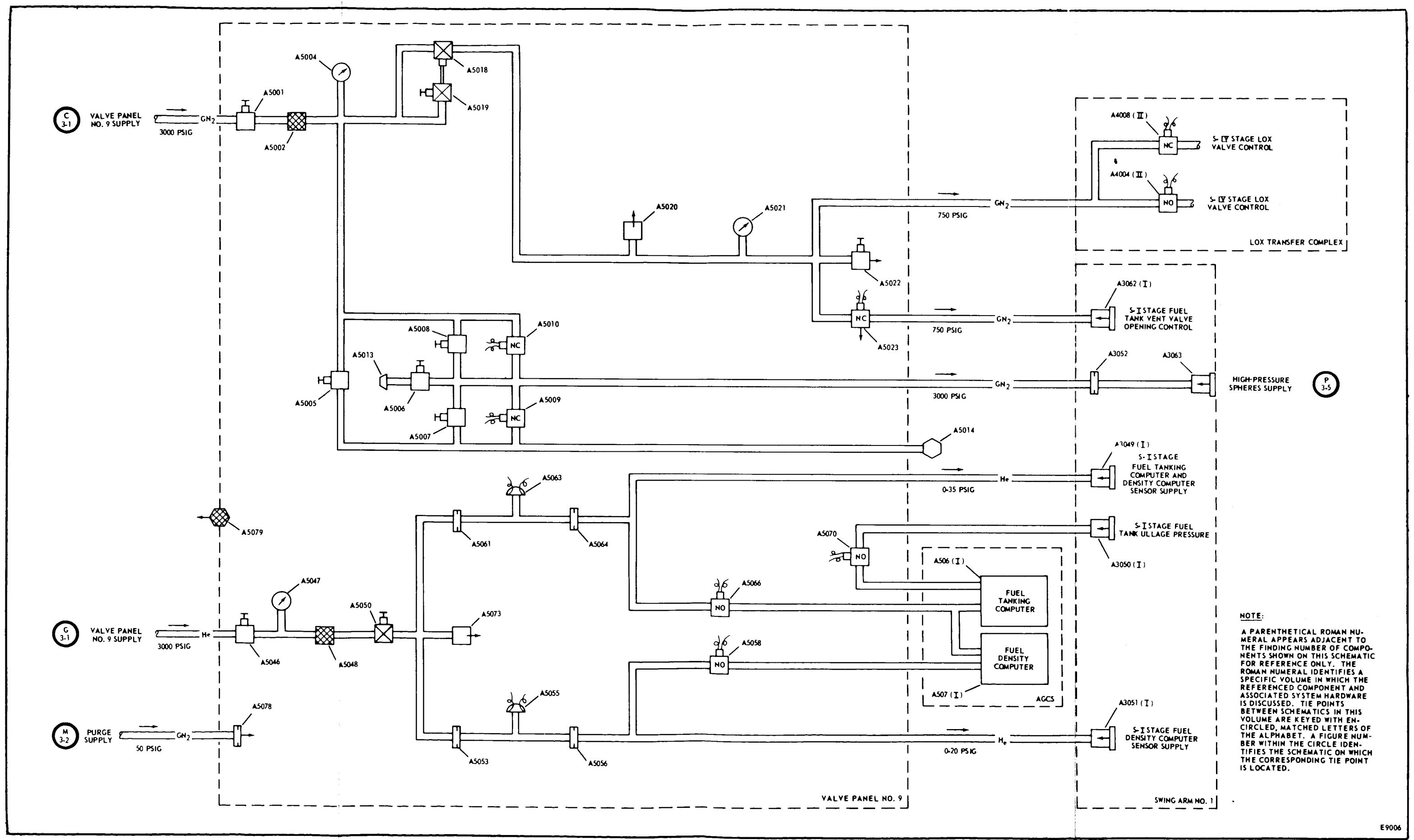

Figure 3-3. Valve Panel No. 9 - Mechanical Schematic

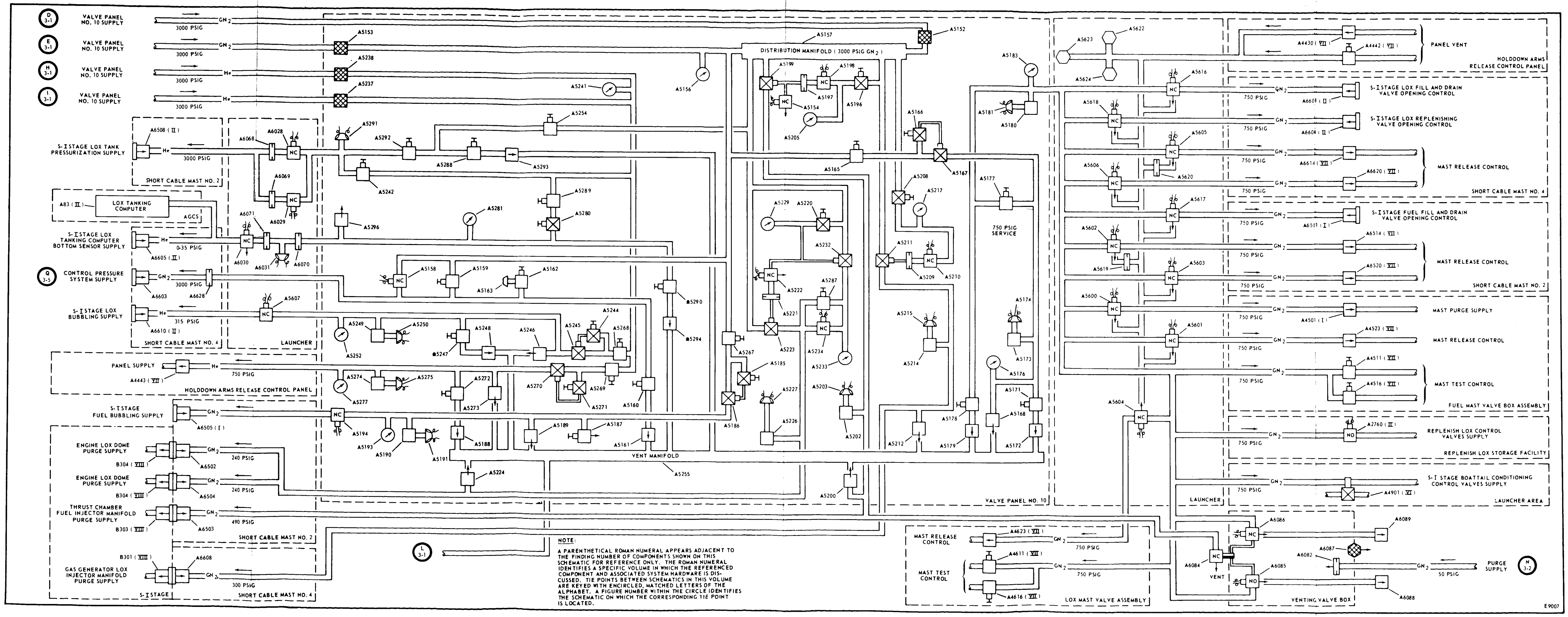

Figure 3-4. Valve Panel No. 10 - Mechanical Schematic

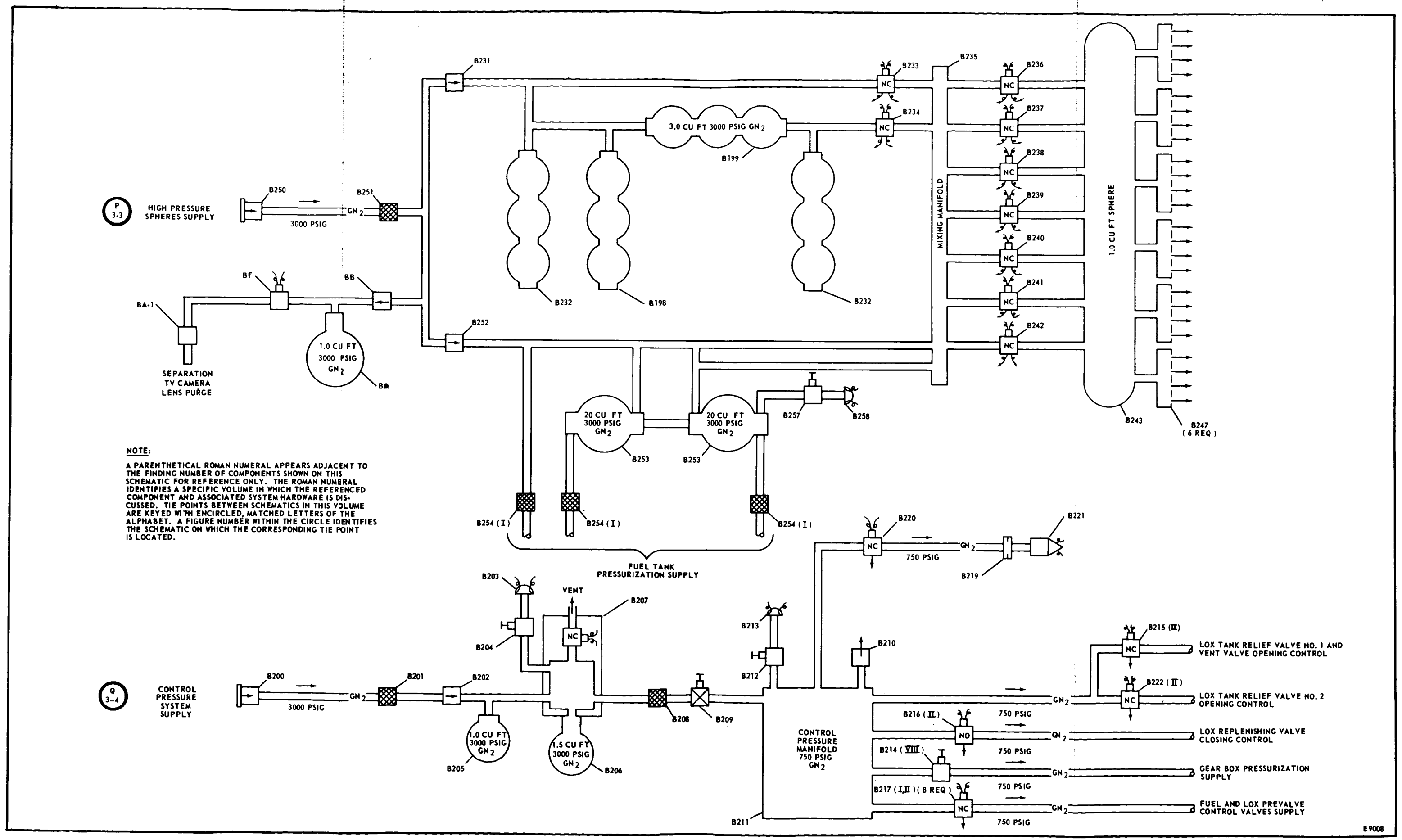

Figure 3-5. S-I Stage GN_2 Systems - Mechanical Schematic

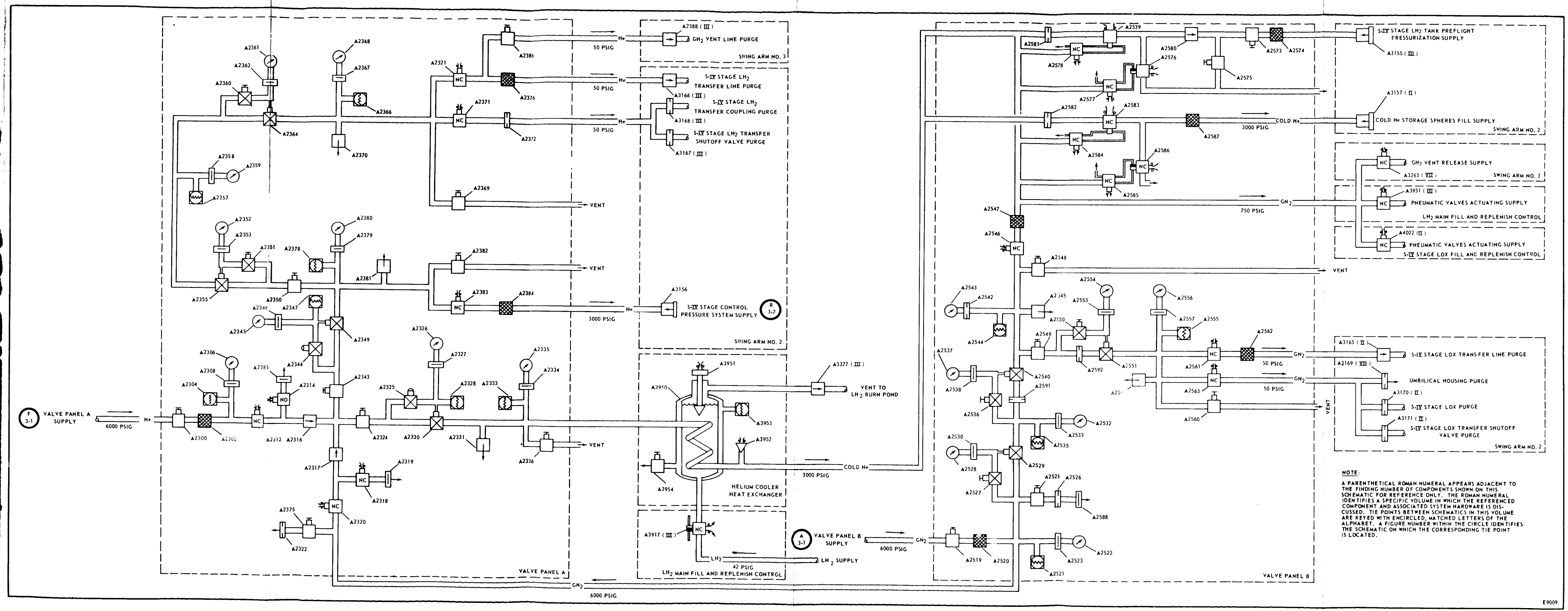

Figure 3-6. Valve Panels A and B, and Helium Cooler - Mechanical Schematic

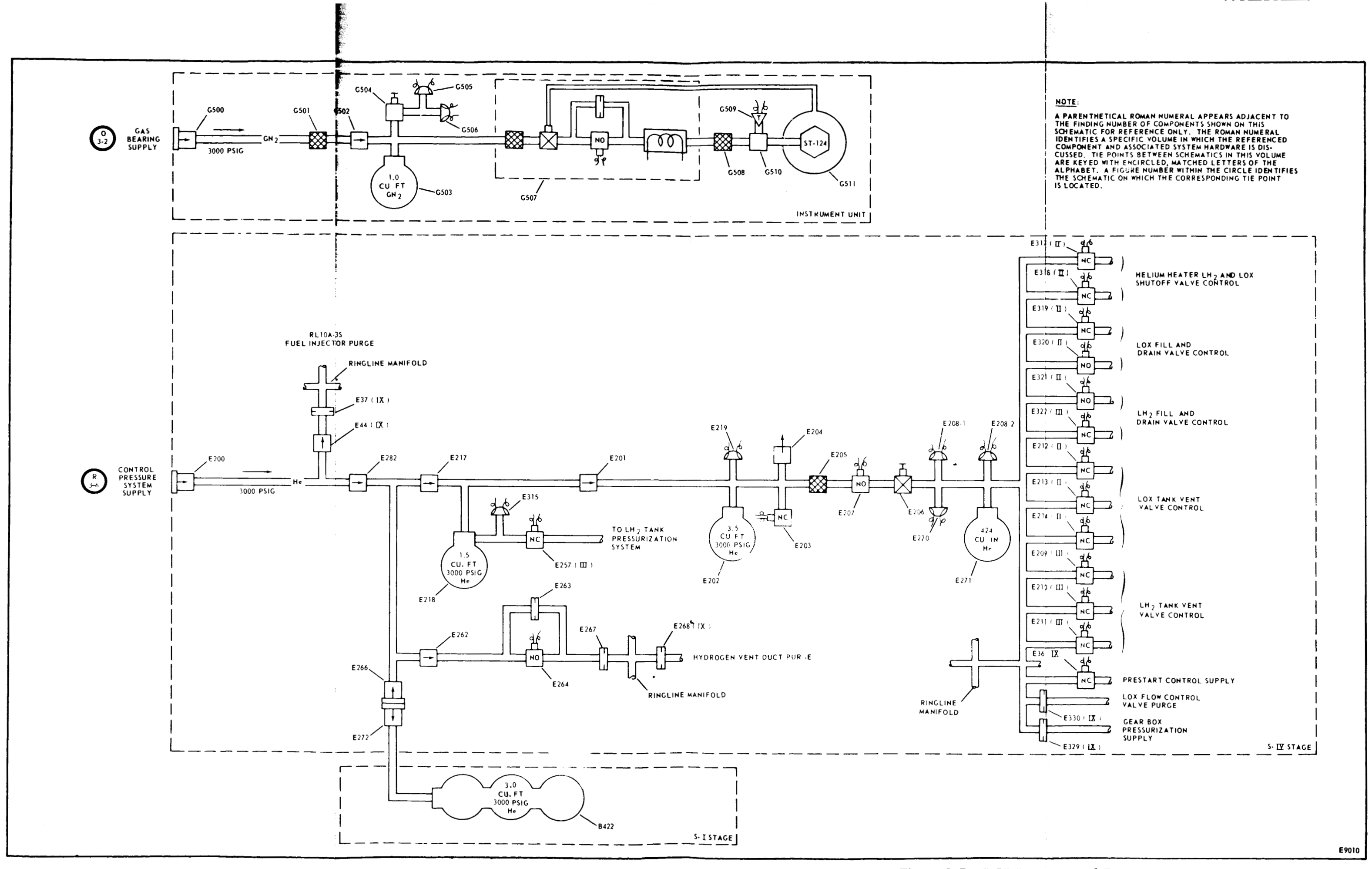

Figure 3-7. S-IV Stage Control Pressure System - Mechanical Schematic